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ANNALS

OF

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A MONTHLY REVIEW  
OF SURGICAL SCIENCE AND PRACTICE

EDITED BY  
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LITERATURE, ABSTRACTS ARE PRESENTED.

---

- AGNEW, D. H., Philadelphia, 152, 258, 265.  
 ALBRECHT, Dr., Hamburg, 442.  
 ANNEQUIN, M., France, 502.  
 ARMSTRONG, S. T., U. S. M. H. S., 251.  
 ARTHRAUD, G., Paris 232.  
 BELFIELD, W. T., Chicago, 187.  
 BENNETT, W. H., England, 257.  
 BERGER, P., Paris, 151, 361.  
 BERGMANN, E., von, Berlin, 85.  
 BIRCHER, H., Bern, 268.  
 BIDON, M., Paris, 354.  
 BIRD, G., London, 516.  
 BIRDSALL, W. R., New York.  
 BOUILLY, G., Paris, 94.  
 BOURDIN, M., Paris, 354.  
 BRIDDON, C. K., New York, 82.  
 BRIGGS, W. T., Nashville, 264.  
 BRUCH, M., Algiers, 281.  
 BRUNS, P. Tuebingen, 445.  
 BYRD, W. A., Quincy, 265.  
 CALMETTES, R., Paris, 502.  
 CARDENAL, Dr., Barcelona, 364.  
 CARPENTER, W. H., New York, 141.  
 CARSON, N. B., St. Louis, 168.  
 CATANI, Dr., Florence, 512.  
 CHAMBARD-HENON, Dr., Lyon, 69.  
 CHOLZEN, Dr., Breslau, 282.  
 CORNIL, M., Paris, 277.  
 CULLINGWORTH, C. T., England, 257.  
 CZERNY, Prof., Heidelberg, 88.  
 DAGNINO, E., Caracas, 68.  
 DAVIES-COLLEY, Mr., London, 218.  
 DENNIS, F. S., New York, 258.  
 DERUYTER, Dr. Berlin, 445.  
 DONAT, Dr. Odessa, 163.  
 DUMONT, F., Bern, 144.  
 EDLER, L., Metz, 432.  
 EISELBERG, A. von, Vienna, 446, 498.  
 EPPINGER, H., Graz, 419.  
 FAHRENBACH, O. Goettingen, 52.  
 FARLOW, J. W., Boston, 67.  
 FENWICK, H., London, 249.  
 FERRET, Dr., France, 501.  
 FICK, A. E., Cape Colony, 74.  
 FINCKH, A., Tuebingen, 54.  
 FORGUE, M., France, 56.  
 FREEMANN, H. W., 274.  
 FREEMAN, W. J., Florence, 512.  
 GANZETTI, Dr., Italy, 278.  
 GARDNER, W., Glasgow, 254.  
 GERSTER, A. G., New York, 142, 156, 160.  
 GROSS, S. W., Philadelphia, 413.  
 HAHN, E., Berlin, 500, 503.  
 HARTLEY, F., New York, 187.  
 HEATH, C., London, 348.  
 HELFERICH, Prof., Greifswald, 447.  
 HEMENWAY, H. B., Kalamazoo, 84.  
 HILDEBRANDT, Dr., Germany, 409.  
 HOLT, L. E., New York, 159.  
 HOOD, P., London, 249.  
 HORWITZ, Dr., Germany, 354.  
 HUBER, F., New York, 159.  
 HUTTON, T. J., Fergus Falls, 144.  
 ISRAEL, J., Berlin, 499.  
 JOHNSTONE, A. W., Danville, 95.  
 KAPP, Dr., Breslau, 282.  
 KARG, Dr., Germany, 497.  
 KEEN, W. W., Philadelphia, 166.  
 KEGAN, D. F., Indore, 178.  
 KINLOCH, R. A., Charleston, 165.  
 KLUMKE, A., Paris, 151.  
 KOEHL, E., Germany, 492.  
 KOENIG, Prof., Goettingen, 139, 491.  
 KOELLIKER, Dr., Wurzburg, 492.  
 KOLLOCK, C., Cheraw, 165.  
 KRASKE, P., Freiburg, 442.  
 KRAUSE, P., Halle, 416.  
 KUEMMELL, H., Hamburg, 182, 504.  
 LANDAU, L., Berlin, 191.  
 LANDERER, A., Leipsic, 485.  
 LANDSBERG, Dr., Breslau, 282.  
 LANG, E., Vienna, 353.

- LANGE, F., New York, 83, 156.  
 LANGENBUCH, C., Berlin, 286.  
 LARGER, M., Paris, 63.  
 LEOPOLD, G., Dresden, 272.  
 LLOYD, R. W., London, 137.  
 LOEBKER, Dr., Germany, 491.  
 LOVETT, R. W., New York, 253.  
 LUCAS-CHAMPIONNIERE, J., Paris, 356.  
 LUCY, R., Worcester, 218.  
 LUSK, W. T., New York, 280.  
 MAAS, H., Wurzburg, 172.  
 MACCORMAC, W., London, 130, 175.  
 MARKOE, T. M., New York, 67.  
 MARSH, H., London, 270.  
 MAUBRAC, M., France, 56.  
 MAY, B., Birmingham, 255.  
 MCBURNEY, C., New York, 96, 171.  
 MCGRAW, T. A., Detroit 505, 507.  
 MEARS, J. E., Philadelphia, 153.  
 MEYERS, W. H., Fort Wayne, 162.  
 MICHAEL, J. E., Baltimore, 169, 266.  
 MIKULICZ, J., Koenigsberg, 503.  
 MILES, A. B., New Orleans, 142.  
 MILLARD, H. B., New York, 142.  
 MONOD, C., Paris, 232.  
 MORRIS, H., London, 266.  
 MORRIS, P., England, 515.  
 MUDD, H. H., St. Louis, 265.  
 MUELLER, P., Germany, 275.  
 MUNRO, J. C., Boston, 253.  
 NEALE, R., London, 144.  
 NEVE, E., Kashmir, 157.  
 NUSSBAUM, Prof., Munich, 140.  
 OBALINSKI, Prof., Cracow, 502.  
 OGSTON, A., Aberdeen, 248.  
 ORLOVSKY, Dr., Warsaw, 164.  
 PACKARD, J. H., Philadelphia, 260.  
 PAGE, Mr., Newcastle-on-Tyne, 66.  
 PARKER, K., Liverpool, 514.  
 PARKER, R. W., London, 192.  
 PODREZ, A. G., Harkoff, 162.  
 PONCET, A., Lyon, 185, 272.  
 PORTER, W. H., New York, 284.  
 POWER, H., London, 60.  
 POTAIN, Paris, 282.  
 PUZEY, C., England, 171.  
 QUEDILLAC, M., Paris, 355.  
 RANKE, H. R., Groningen, 189.  
 RECLUS, Paris, 339.  
 REGNAULT, C., Heidelberg.  
 REUSS, Dr., Berlin, 504.  
 RIED, E., Munich, 92.  
 ROBERTS, J. B., Philadelphia, 266.  
 ROBERTS, M. J., New York, 145.  
 ROE, J. Q., Rochester, 252.  
 ROLLAND, M., France, 501.  
 ROSATI, Dr., Florence, 512.  
 ROSENBAACH, Dr., Goettingen, 444.  
 ROTTER, E., Munich, 285.  
 SAINT-AVID, M., Paris, 355.  
 SANDS, H. B., New York, 80, 148.  
 SAVORY, W. S., London, 65.  
 SCHAECHTER, M., Budapest, 366.  
 SCHLANGE, Dr., Berlin, 447.  
 SCHMIDT, HANS, Goettingen, 409.  
 SCHMITZ, A., St. Petersburg, 179.  
 SCHRAMM, H., Lemberg, 74.  
 SCHWARTZ, M., Paris, 64.  
 SEE, M., Paris, 258.  
 SEYDEL, K., Munich, 287.  
 SHEPHERD, F. J., Montreal, 185.  
 SHRADY, G. F., New York, 76.  
 SMITH, J. G., Bristol, 518.  
 STEWART, W. R. II, London, 274.  
 STERLING, E. C., Dublin, 275.  
 STOKES, W. T., England, 270.  
 TERRILLON, O., Paris, 164, 276.  
 TIFFANY, L. McL., Baltimore, 186, 250.  
 VAN DERVEER, A., Albany, 263.  
 VARICK, T. R., Jersey City, 266.  
 VOLKMANN, R. von, Halle, 491.  
 WAGNER, C., New York, 148.  
 WAINEWRIGHT, B., London, 70.  
 WARREN, J. C., Boston, 77, 265.  
 WATSON, B. A., Jersey City, 251.  
 WEIR, R. F., New York, 78, 149, 508.  
 WEIST, J. R., Richmond, 265.  
 WHARTON, H. R., Philadelphia, 147.  
 WILKIN, C. H., New York, 170.  
 WITZEL, O., Bonn, 227.  
 WOLFLER, A., Graz, 286.  
 WYETH, J. A., New York, 152, 513.  
 WYLIE, W. G., New York, 160.  
 YANDELL, D. W., Louisville, 266.  
 ZESAS, D. G., Bern, 72.  
 ZWEIFEL, P., Erlangen, 367.



# INDEX.

- ABBE, R.**, Aneurisms treated by introduction of catgut or of wire with electricity, 307.
- Abdomen** (see hydatids, intestine, laparotomy, peritoneal), surgery of, 35, 49, 71, 72, 74, 94, 95, 96, 130, 160, 162, 164, 165, 168, 169, 192, 193, 272, 324, 356, 369, 450, 465, 503, 504, 505, 507, 508, 512, 513, 514, 515, 516; Traumatic injuries of parenchymatous organs of, 432.
- Abdominal section**, see laparotomy.
- Abdominal surgery.** Review of Greig Smith on, 518.
- ABRAHAM, P. S.**, On the suture of nerves, 339.
- Abscess**, Case of chronic cerebral, 480; Laparotomy for perityphlitic, 78, 508; Operation for perityphlitic, 78; Perinephritic, 35; Post-pharyngeal, 70.
- Adenoid vegetations** of naso-pharynx, Treatment of, 502.
- Adenoma**, Nephrectomy for, 37.
- Amputation** at hip-joint, 46; in diabetic gangrene, Revision of teachings regarding, 139; of leg, 46, 66; of upper extremity, Review of Berger on interscapulo-thoracic, 361.
- Amygdalotomy**, Hemorrhage after, 148.
- Anesthesia**, Contagion through the use of ether inhalers, 137.
- Anæsthetics** (see chloroform, ether), 327; Influence of nephritis on the safety of, 141, 142; Practical points in administration of, 214.
- Anatomy**, Harvey's manuscript lectures on, Review of, 527.
- Aneurism**, Causes and development of, 419; Cirroid, treated by simultaneous ligature of both external carotids, 67; Ligature of right common carotid and subclavian arteries for innominate, 147; of anterior tibial artery, Diffused traumatic, 66; Popliteal, 48; State of femoral artery after ligature for popliteal, 65; treated by introduction of catgut or wire with electricity, 307.
- Ankle**, Neuropathic affections of, 89; Resection from an external transverse incision, 144.
- Ankylosis** of jaws, 153.
- Antiseptic**, Action of iodoform as an, 445; Methods at the New York Hospital, 47; Surgery, Review of Cardenal on, 304.
- Appendix vermiformis**, Laparotomy for perforated, 41, 78, 508.
- Anus** and introduction of hand, Obstruction of intestine by fecal impaction treated by division of, 515.
- Aphasia**, 69.
- Arm**, see extremities.
- Artery** (see also aneurism, blood vessels), Anterior tibial, Diffused traumatic aneurism of, 66.  
 —Carotid, for cirroid aneurism, Simultaneous ligature of both, 67; Ligature of common for innominate aneurism, 147; Ligature of common for tonsillar hemorrhage, 148; Ligature of external, 111, 115.  
 —Colic, wound of, 324.  
 —Femoral, after ligature for popliteal aneurism, State of, 65; Ligature of, 48.  
 —Innominate, Aneurism of, 147.  
 —on posterior wall of pharynx, Large visible pulsating, 67.  
 —Popliteal, Aneurism of, 65; in elephantiasis of leg, Ligature of, 68.  
 —Subclavian, Ligature of right for innominate aneurism, 147.
- Arthrotomy**, 44.
- Astragalus**, Fracture and dislocation of, 405.

ATKINS, C., Abstracts, 192.

Axis with recovery, Subluxation of, 502.

**BACTERIOLOGY** in its relations to surgery, 60.

BARTON, J. K., Œsophagotomy, 22.

Berger on interscapulo-thoracic amputation of the upper extremity, Review of, 361.

BERNAYS, A. C., A new surgical operation for the treatment of cancer of the stomach, 450.

Bladder (see calculus, cholecystotomy, cystotomy, litholapaxy, lithotomy), Diagnosis and treatment of tumors of urinary, 182; Extroversion of, 104; Operation for rupture of, 175; Operations for stone in, 263; in children, operations for stone in, 178, 179.

Bone (see also elbow, femur, fracture, necrosis, osteoclasia, resection, tibia); Osteogenic factors in development and repair of, 289; 389.

Bones in general paretics, Abnormal fragility and delayed and non-union of fractures of long, 28; Surgery of, 28, 43, 83, 84, 85, 92, 144, 145, 153, 201, 268, 270, 272, 289, 318, 348, 389, 405, 424.

Brain (see also meningeal), Case of chronic abscess of, 480; Removal of sarcoma of, 149; Wound of, 69.

Breast (see mammary), cancer of, 78.

Bright's disease, see nephritis.

Bronchus, Œsophagotomy for a penny which had ulcerated into the, 255.

BROWNING, W., Abstracts, 71, 72, 74, 88, 139, 144, 172, 179, 189, 191, 268, 275, 432, 442, 444, 445, 446, 447, 499, 500, 502, 503, 504.

—Review of Berger on interscapulo-thoracic amputation of the upper extremity, 361.

BRYANT, J. D., Ligature of external carotid artery, 115.

Bursæ, Tumors of, 189.

**CADAVER**, Review of Rotter on typical surgical operations on, 285.

Cæsarean section, Successful case of, 280.

Calculus (see also cystotomy, litholapaxy, lithotomy, nephrolithotomy) from kidney, Removal of enormous, 185; Vesical, 33; Manipulation without incision as a possible treatment in renal, 257.

Cancer, 409, 423; Carbonate of lime for arresting growth of, 249; by operation, Cure of, 76; of ovaries, Frequency and operative treatment of, 272; of rectum, Colotomy for, ; of stomach, New operation for, 450; Personal experiences in, 77; Transformation of gummatous lesions into, 353.

Carcinoma, Statistics of mammary, 409; Vaginal hysterectomy for, 275.

Cardenal on antiseptic surgery, Review of, 304.

Carotid, see artery.

Castration, Double, 31; for tuberculosis of testicle, 54.

CATHCART, C. W., Abstracts, 255, 276, 277, 278.

Cerebrum, see brain.

Chance of the uterus, Non-infecting, 355.

CHAVASSE, T. F., On thyroidectomy, 1.

Chest, Surgery of, 152, 156, 159, 160.

Cheek, New plastic method for, 499.

Children, Operations for vesical calculus in, 178, 176.

Chloroform, Dangers of anæsthesia by, 143; narcosis, puncture of the heart in, 251; or ether—which? 327.

Cholecystomy, 164.

Cirroid, see aneurism.

CLARKE, W. B., Abstracts, 257.

Clubfoot, Operative treatment of, 92.

Coffee to disguise the odor of iodoform, 144.

Coin in the œsophagus, 256.

Colic, see artery.

COLLES, C. J., Abstracts, 85, 182, 272.

Colotomy complicated with abnormal conditions, 465.

Contagion through the use of ether inhaler, 137.

Corrosive sublimate, see sublimate.

Cranial and heart-injuries, Simultaneous self-inflicted, 152.

CURTIS, B. F., Castration for tuberculosis of the testicle, 54.

———Injuries of tendon, 227.

———Pathological dislocations, 54

Cyst of knee and wrist, Synovial, 171 ;

Subdiaphragmatic hydatids, 191.

Cystic sarcoma, Laparotomy for removal of large renal, 257 ; of lower jaw, Removal of 126.

Cystotomy, Lateral, 33 ; suprapubic, 258, 260, 264 ; Suprapubic for supposed tumor, 34.

**DIABETIC** gangrene, Revision of teachings regarding major operations in, 139.

Diaphragmatic hydatids, Sub-, 191.

Development and repair of bone, Osteogenic factors in, 289, 389.

Diphtheria, Causes of difficulties in dispensing with the tube in some cases of tracheotomy for, 492.

Dislocation of astragalus with fracture, 405 ; of axis, Partial, 502 ; of elbow, Old, 201 : femur into thyroid foramen, 48 ; of hip, 266 ; Pathological, 56.

Dressing materials, Germs contained in, 446 ; Review of Langenbuch on military surgical, 286 ; Ste ile, 447 ; Tannic acid as a surgical, 144.

DUNN, H. P., Abstracts, 66, 70, 157, 248, 270, 51, 4 515.

**ECHINOCOCCUS**, Cases of, 74.

Ectopic gestation, 94, 95, 281.

EDWARDS, F. S., Abstracts, 175, 178.

Elbow, Neuropathic affections of, 90 ; Old dislocations of, 201 ; Resection of, 43.

Electricity, Aneurism treated by introduction of catgut or of wire with, 307 ; for medical and surgical purposes, Thermopile and secondary battery for producing, 248.

Elephantiasis of leg, Ligature of popliteal in, 68.

Empyema, Cure of fistula from, 160 ; in children, 159.

Enterectomy for strangulated hernia, 168.

Epididymis, Fibroma of, 185.

Epithelioma of larynx, Thyrotomy for, 254 ; of penis, 31.

Erysipelas by ichthyol, Treatment of, 140.

Erysipeloid and its etiology, 444.

Estlander's operation, Cure of old thoracic fistula by, 160.

Ether, Best method of administering, 214 ; Dangers of anæsthesia by, 141, 142 ; inhalers, Contagion through the use of, 137 ; or chloroform—which? 327.

Excision of hip, New method for, 145.

Extroversion of bladder, 104.

Extrauterine pregnancy, 94, 95, 281.

Extremities, Surgery of, 43, 170, 171, 172, 227, 361, 405.

Eye, for traumatic intracapsular hemorrhage, Incision of the, 501.

**FACE**, Cancer of, 77.

Fæces treated by division of the anus and introduction of hand. Intestinal obstruction from impaction of, 515.

Fallopian (see also salpingitis) tubes, Removal of, 41.

Femoral, see artery ;

Femur (see also dislocation), Necrosis of lower end of, 43 ; Osteoplastic operation after necrosis of, 83 ; Ununited fracture of, 48.

Fibroma of epididymis, 185.

Fistula by Estlander's operation, Cure of old thoracic, 160 ; Renal, 35.

Flat-foot, Resection of astragalo-scapoid joint for, 45.

Foot (see also astragalus, flat) Operative treatment of club, 92.

Foreign body, Laparotomy for removal of an ingested, 512.

Fracture (see also bones) of astragalus with dislocation, 4, 5 ; of patella, Treatment of old transverse, 85 ; of scapula (anatomical neck), 84 ; of skull, 69 ; of skull by contre coup, 151 ; of tubular bones, New method of retention in, 268 ; of vertebra, cervical, 156 ; Transplantation of bone for ununited, 272 ; Ununited, 48, 272.

- GALL BLADDER, Incision of the, 164.
- Gangrene of median nerve without loss of function in supplied parts, 501.
- Revision of teachings regarding major operations in diabetic, 139.
- Gastrostomy, Observations of the operations of, 516.
- General surgery, 47, 52, 60, 63, 71, 74, 137, 139, 140, 141, 142, 144, 214, 248, 249, 250, 251, 286, 327, 364, 442, 444, 445, 446, 447, 497, 498.
- Genitals, Review of Zweifel on diseases of external female, 367.
- Genito-urinary surgery, 8, 31, 52, 175, 178, 179, 182, 185, 186, 187, 257, 258, 260, 263, 277, 366.
- Germ (see also micro-organisms) contained in soap and dressing, 446.
- GERSTER, A. G., Exsection of the knee-joint for tuberculosis, 318.
- Gestation, Ectopic, 94, 95, 281.
- GIRDNER, J. H., Abnormal fragility and delayed and non-union of fractures of long bones in general paretics, 28.
- Gland, see parotid, thyroid.
- Goitre, Review of Wölfler on surgical treatment of, 286.
- Gonorrheal salpingitis, 277.
- GRAHAM, D., Treatment of scoliosis by massage, 485.
- Groin, Recurring sarcoma of, 44.
- Gut, see intestine.
- Gunshot wounds, 49, 134, 152, 165, 168, 369, 504, 505, 507.
- Gynecology, 94, 95, 96, 272, 274, 275, 276, 277, 278, 280, 181.
- HÆMATOMA, Trephining in intracranial, 251.
- Hæmato-salpingitis, 276.
- Hæmorrhage after ovariectomy, Secondary intra-peritoneal, 274; after tonsillectomy, 148; in vaginal hysterectomy, Control by forceps of, 275; Ophthalmotomy for traumatic intra-capsular, 501; Partial goitre-extirpation without tamponade or, 500.
- Hæmorrhagic secondary syphilis, 354.
- Hallux flexus, 218.
- Harvey's manuscript lectures on anatomy and physiology, Review of, 527.
- Head, Penetrating wound of, 69; Surgery of, 69, 151, 152, 153, 156, 251, 252, 287, 471, 480, 499, 500, 501, 502.
- Heart injuries, Simultaneous self-inflicted cranial and, 152 motion, Artificial respiration and, 442.
- HELMUTH, W. T., Malignant tumors of upper jaw, 471.
- Hemiplegia, 69.
- Hernia, Enterectomy for strangulated, 168; Excision of portion of intestine in strangulated, 514; Management and treatment of umbilical, 193; of ovary, 96; Operation for ventral, 169; Review of Lucas-Championniere on radical cure of, 356.
- Hip, Amputation at, 46; Dislocation of, 48; 266; New method for excision of, 145.
- Hospital wards, Micro-organisms in air of, 498.
- HUTCHINSON, JUN., J., Abstracts, 185, 282, 502.
- Certain points in connection with syphilis, 353.
- Hydatids (see echinococcus) Subdiaphragmatic, 191.
- Hydrarthrosis of knee, Antiseptic irrigation for, 44.
- Hydrocele, Double, 31.
- Hysterectomy, Control of hæmorrhage by forceps in, 275; Vaginal, 275.
- Hysterical paralysis in syphilitic subjects, 282.
- ICHTHYOL, Treatment of erysipelas by, 140.
- Inflammations, Connective tissue-cell changes in acute, 497.
- Ingrowing toe-nail, 48.
- Inhalers, Contagion through the use of ether, 137.
- Intestine (see also appendix, colotomy, hernia, jejunum, pylorus, peri-typhlitic, rectum) after separation from mesentery, Behavior of, 72; by fecal impaction treated by division of anus and intro-

- duction of hand, Obstruction of, 515; Gunshot wounds of, 369; Herniotomy with excision of part of, 514; in strangulated hernia, Resection of, 168; Laparotomy for gunshot wound of, 155, 166, 507; Laparotomy for injury of, 130; Purgatives in treatment of obstruction of, 160; Resection and suture of, 513, 514; Umbilical hernia of, 193; Ventral hernia of, 169.
- Iodoform, Antitubercular action of, 445; as an antiseptic, Action of, 445; Coffee to disguise the odor of, 144.
- J**AUNDICE, Syphilis and, 355.
- Jaw and its treatment, Closure of, 153; for removal of sarcoma of pharynx; Partial exsection and dislocation of, 156; Heath on certain diseases of, 348; Malignant tumors of upper, 471; Removal of cystic tumor of lower, 126.
- Jejunum, To find the beginning of the, 503.
- JENKINS, A. R., Case of chronic cerebral abscess, 480.
- Joint (see also arthrotomy, astragalus, hip, knee, metacarpo-phalangeal, pathological dislocations, shoulder, temporomaxillary, wrist); Neuropathic affections of, 88; Surgery, 44, 52, 56, 76, 85, 88, 153, 201, 218, 266, 270, 318, 424.
- Review of Greig Smith on abdominal surgery, 518.
- Review of Lucas-Championniere on the radical cure of hernia, 356.
- Review of Wilde's medical annual and practitioner's index, 288.
- Kidney (see also nephrectomy, nephrotomy, nephrolithotomy, renal) Digital exploration of, 187; Laceration of, 35; Laparotomy for removal of a large cystic sarcoma of, 257; Manipulation without incision as possible treatment in stone in, 257; Nephrectomy for gunshot wound of, 166; Removal of enormous calculus from, 185; Stab wound of, 187; Traumatic injuries of, 439.
- Knee (see also genu, patella) -joint, Antiseptic irrigation of, 44; -joint for tuberculosis, Exsection of, 318; -joint, Method of fixing bones in excision of, 270; -joint, Ollier on simplification of post-operative treatment of resection of, 424; -joint, Sarcomatous floating tumor of, 76; -joint, Some elements of success in excision of, 270; Synovial cyst of, 171.
- KOPLIK, H., Abstracts, 497, 498.
- Koehl on the causes of the difficulties in dispensing with the tube in some cases of tracheotomy for diphtheria, 294.
- Recent contributions on the subject of tumors, 409.
- K**EETLEY, C. B., Abstracts, 144, 272.
- Heath on certain diseases of the jaws, 348.
- MacCormac on abdominal section for the treatment of intra-peritoneal injury, 130.
- Management and treatment of old umbilical hernia, 193.
- Notes on plastic surgery, 97.
- On contagion through the use of ether inhalers, 137.
- On simplification of post-operative treatment of resection of knee-joint, 424.
- On stiffness and tenderness of the metacarpo-phalangeal joint of the great toe and on hallux flexus, 218.
- L**ANGENBUCH on principles of military surgical dressing, Review of, 286.
- Laparo-elytrotomy, 278.
- Laparotomy (see also Cæsarean section, cholecystotomy, gastrotomy, ovariectomy, splenectomy) and enterectomy for strangulated hernia, 168; for cancer of stomach, 450; for extra-uterine pregnancy, 94, 95; for gunshot wound of the abdomen, 369; for gunshot wound of the intestines, 165, 166, 505, 507; for intra-peritoneal injury, 130; for penetrating stabwound of the abdomen, 324; for perforated appendix vermiformis, 41, 508; for perforating pistol shot wound of the abdomen, 49; for removal of a table fork, 512; for removal of uterine



- appendages, 41; for rupture of urinary bladder, 175; for a suppurating abdominal tumor, 41; for tuberculosis of peritoneum, 504; for visceral injuries, 505; with resection and suture of gangrenous intestine for strangulated hernia, 514; Review of Greig Smith on, 518; to prevent shock, Use of hot water in peritoneal cavity during and after, 160.
- Larynx, Excision of, 254; Thyrotomy for epithelioma of, 254.
- Leg (see also extremities) Amputation of, 46, 66; Ligature of popliteal artery in elephantiasis of, 68.
- Lime for arresting growth of cancerous tumors, Carbonate of, 249.
- Ligature for popliteal aneurism, State of femoral after, 65; of anterior tibial artery, Attempted, 66; of both external carotid arteries for cirroid aneurism, 67; of external carotid artery, 111, 115; of right common carotid and subclavian arteries for innominate aneurism, 147.
- Litholapaxy, 33, 263; in male children and adults, 147.
- Lithotomy, 263; in children, Lateral, 182; in children, Median, 181; Suprapubic, 258, 264.
- Lithotripsy in children, 182.
- Liver (see also hydatids) Pistol shot wound of, 166; Traumatic injuries of, 435.
- Locomotor ataxy, 89.
- Lucas-Championniere on the radical cure of hernia, Review of, 356.
- Lungs for phthisical cavities, Incision and free drainage of, 137; Hydatids of, 74; Syphilis as an etiological factor in diseases of, 284.
- Luxation, see dislocation.
- MACEWEN, W.**, Osteogenic factors in development and repair of bone, 289, 389.
- Mammary cancer, 78; carcinoma, Statistics of, 409; sarcoma, Female, 413.
- MARK, L.**, Abstracts, 63, 64, 69, 281.
- Massage, Treatment of scoliosis by, 485.
- Maxilla, see jaw.
- Meningeal hæmatoma, Trephining in intra-, 251.
- Mercuric bichloride, see sublimate.
- Mercury by the urine, Elimination of, 282; in syphilis, Subcutaneous injection of mild chloride of, 282.
- Mesentery, Behavior of gut after separation from, 72.
- Mesocolon, Wound of, 324.
- Metacarpo-phalangeal joint of great toe, Stiffness and tenderness of, 218.
- MICHAEL, J. E.**, Perineal urethrotomy 8.
- Microbes, see bacteriology.
- Micro-organisms, (see bacteriology) 445, 446, 447; in air of hospital wards, 498.
- Military surgical dressings, Review of Langenbuch on, 286.
- Modelling in recording surgical cases, Clay-, 249.
- Morphine before anæsthesia, Danger of administering, 214.
- NÆVUS** by incision, Treatment of, 192.
- Neck, Surgery of, 1, 22, 64, 70, 157, 253, 254, 255, 502.
- Necrosis of femur, Osteoplastic operation after, 83; of lower end of femur, 43.
- Negroes, Comparison of surgical diseases of whites and, 250.
- Neoplasms (see also tumors) of both parotid glands, Removal of, 152; of urinary bladder, Diagnosis and treatment of, 182.
- Nephrectomy for adenoma, 37; for gunshot wound of the kidney, 166.
- Nephritis on safety of anesthetics, Influence of, 141, 142.
- Nephrolithotomy, 185, 558; during the fifth month of pregnancy, 186.
- Nephrotomy, 37.
- Nerve, Stretching and resection of spinal accessory, 64; suture, 339.
- Nerves, Surgery of, 69, 88, 146, 339, 416, 501.
- Neuromata, Malignant, 416.
- Neuropathic joint affections, 88.
- Nitrous oxide, Best method of administering, 214.
- Nose and Pharynx, Treatment of adenoid vegetations of, 502; New plastic operation for saddle—, 499; Operative relief of deformity termed pug, 252.

**ŒSOPHAGOTOMY**, 22; for a penny which had ulcerated into the bronchus, 255.

**Œsophagus**, Cancer of, 78.

**Operative surgery**, 144, 145, 285.

**Opium** before anæsthesia, danger of administering, 214.

**Ophthalmotomy** for traumatic intracapsular hæmorrhage, 501.

**Orthopedic surgery**, 92, 270, 424, 485.

**Osteogenic factors** in development and repair of bone, 289, 389.

**Osteotomy**, 44.

**Ovaries**, Removal of, 41.

**Ovariectomy** followed by secondary intraperitoneal hæmorrhage, 274.

**Ovary**, Frequency and operative treatment of malignant growths of, 272; Hernia and removal of, 96.

**PANCREAS**, Traumatic injuries of, 438.

**Paralysis**, (see hemiplegia) in syphilitic subjects, Hysterical, 282.

**Parkes**, C. T., A review of some facts connected with gunshot wounds of the abdomen, and practical deductions therefrom, 369.

**Parotid glands**, Removal of neoplasms of both, 152.

**Patella**, Treatment of old transverse fracture of, 85.

**Penis**, amputation of, 31.

**Perineal urethrotomy**, 8.

**Perineum**, Review of Zweifel on laceration of, 367.

**Periosteum** in repair of bone, 290, 389.

**Peritoneal cavity** after and during laparotomy to prevent shock, Use of hot water in, 160.

**Peritoneum** (see also laparotomy), Palliative incision for tuberculosis of, 504.

**Peritonitis** by use of purgatives, Treatment of septic, 160; Treatment of tubercular, 71.

**Perityphlitic abscess**, Operation for, 78, 508.

**Pharyngeal abscess**, Post-, 70.

**Pharyngotomy** for removal of tonsillar tumors, Lateral, 502.

**Pharynx**, Large visible pulsating artery on posterior wall of, 67; Removal of sarcoma of, 156; Treatment of adenoid vegetations of the naso-, 502.

**Phthysical cavities**, Incision and free drainage of lung for, 157.

**Phthisis**, Syphilitic, 284.

**Physiology**, Review of Harvey's manuscript lectures on, 527.

**PILCHER**, J. E., Abstracts, 67, 68, 76, 77, 78, 83, 84, 94, 95, 96, 141, 142, 144, 145, 147, 148, 149, 151, 152, 153, 156, 159, 160, 162, 164, 165, 166, 168, 169, 170, 185, 186, 187, 250, 251, 252, 253, 258, 260, 263, 280, 284, 508, 512, 513.

—A new classification of tumors in general and of tumors of the testicle in particular, 232.

—Review of Harvey's manuscript lectures, 527.

**PILCHER**, L. S., Ether or chloroform— which ?, 327.

—Review of Cardenal on antiseptic surgery, 304.

—Review of Schaecter on treatment of wounds, 306.

**Plastic method** for the cheek, New, 499; operation after necrosis of femur, Osteo-, 83; operation for pug nose, 252; operation for saddle nose, New, 499; operation for transplantation of flesh pedunculated flaps from distant parts of the body, 172; Surgery, Notes on, 97.

**Poisoning**, Sublimate, 46.

**Popliteal**, see aneurism, artery.

**POPOFF**, P. J., Abstracts, 162.

**Pregnancy**, Extra-uterine. 91, 95, 281; Nephrolithotomy during fifth month of, 186.

**Pulmonary**, see lung.

**Purgatives** in treatment of septic peritonitis and intestinal obstruction, 160.

**Pylorus**, Operative treatment of stenosis of, 503; Resection of, 74.

**RACES**, Comparison of surgical diseases of white and colored, 250.

- Rectum, Cancer of, 78.
- Renal (see kidney) fistulæ, 35.
- Resection (see also elbow, tibia) of ankle from an external transverse incision, 144; of astragalo-scapoid joint, 145; of gut in strangulated hernia, 513, 514; of knee-joint, Post-operative treatment of, 424; of pylorus, 74; of shoulder, 45; of spinal accessory nerve, 64; of wrist, 45; of wrist for tuberculous disease, 52.
- Respiration and heart motion, Artificial, 442.
- Rhinoplasty for pug nose, 252.
- Ribs, excision of, 160.
- ROGERS, W. B., Operation for removal of colossal cystic tumor of lower jaw, 126.
- Rotter on typical surgical operations on the cadaver, Review of, 285.
- S**ALPINGITIS, Gonorrheal, 277; Hæmato-, 276.
- Sarcoma, 44; Laparotomy for removal of a large renal cystic, 257; of brain, Removal of, 149; of female breast, 413; of knee-joint, Floating, 76; of pharynx, Removal of, 156.
- Scapula, Fracture of anatomical neck of, 84.
- Schaechter on treatment of wounds, Review of, 306.
- Scoliosis by massage, Treatment of, 485.
- Scrotum, see varicocele.
- Septic peritonitis by use of purgatives, Treatment of, 16c.
- Seydel on antiseptic practice and trephining, Review of, 287.
- Shock, Use of hot water in peritoneal cavity during and after laparotomy to prevent, 160.
- Shoulder, Amputation of the, 361; Neuro-pathic affections of the, 89; Resection of, 45.
- SKELLY, J. L., Laparotomy for perforating pistol shot wound of abdomen, 49.
- Skin (see also cutaneous) replaced by fresh pedunculated flaps from distant parts of the body, Lost, 172.
- Skull (see also trephining) by contre coup, Fracture of, 151; Fracture of, 69.
- Smith on abdominal surgery, Review of Greig, 518.
- Soaps, Germs contained in, 446.
- Spine, see scoliosis, vertebra.
- Spleen, Extirpation of, 162; Traumatic injuries of, 437.
- Stab wound of the abdomen, 324; of kidney, 187.
- STIMSON, L. A., Fracture and dislocation of astragalus, 405.
- Old dislocations of the elbow, 201.
- Stomach (see also gastrostomy, pylorus) Gunshot wound and suture of, 166; New operation for cancer of, 450.
- Stone, see calculus, cystotomy, litholapaxy, lithotomy.
- STREET, A. F., Abstracts, 270, 274, 275, 501, 502.
- Sublimate (see also mercuric) poisoning, 46.
- Suprapubic, see cystotomy.
- Surgical disease resulting from upright position of man, 442.
- Suture of intestine, 513; of wounds, Secondary, 447.
- Synovial cysts of knee and wrists, 171.
- Syphilis and cancer, 353; and jaundice, 355; as an etiological factor in pulmonary disease, 284; Certain points in connection with, 353; Conditions increasing the severity of, 354; Hysterical paralysis in subjects of, 282; Subcutaneous injection of calomel in, 282.
- Syphiloma, Diffuse hypertrophic, 354.
- Syngomyely, 90.
- T**ANNIC acid as a surgical dressing, 144.
- Talipes, Operative treatment of, 92.
- TAYLOR, H. H., Abstracts, 60, 65, 171, 249, 254, 266.
- Temporo-maxillary joint, Ankylosis of, 153.
- Tendon, Injuries of, 227; Treatment of ruptured or divided, 170.
- Testicle (see also castration, hydrocele) Castration for tuberculosis of, 54; New



- classification of tumors of 232.
- Tetanus, Etiology of, 63.
- THALLON, W. M., Review of Zweifel on diseases of external female genitals and laceration of the perineum, 367.
- Thermopile and secondary battery for producing electricity for medical and surgical purposes, 248.
- THOMSON, W., Upon some abnormal conditions which may complicate the operation of colotomy, 465.
- Thyroidectomy, 1.
- Thyrotomy for epithelioma of larynx, 254.
- Tibia, Resection of entire, 43.
- Tibial, see artery anterior.
- Toe nail, Ingrowing, 48; Stiffness and tenderness of metacarpo-phalangeal joint of great, 218.
- Tonsil, Hæmorrhage after excision of, 148; Lateral pharyngotomy for removal of tumors of, 502.
- Torticollis, Spasmodic, 64.
- Transplantation of fresh pedunculated skin flaps, 172.
- Tracheotomy, 327 cases of, 253; for diphtheria, Causes of difficulties in dispensing with the tube in some cases of, 492.
- Trephining in intra-meningeal hæmatoma, 251; Review of Seydel on antiseptic practice and, 287.
- Tubal pregnancy, 95.
- Tube (see salpingitis, tubal) Removal of Fallopian, 41.
- Tuberculosis (see also lung) Antitubercular action of iodoform in, 445; Excision of knee joint for, 318; of peritoneum by incision, Treatment of, 71; of peritoneum, Palliative incision for, 504, of testicle, Castration for, 54; of wrist, Resection for, 52.
- Tumor, Laparotomy for a suppurating abdominal, 41; of lower jaw, Removal of cystic, 126.
- Tumors (see cancer, sarcoma, etc.) Carbonate of lime for arresting growth of cancerous, 249; Lateral pharyngotomy for removal of tonsillar, 502; New classification of, 232; of upper jaw malignant, 471; Recent contributions on, 409; Surgery of, 76, 77, 126, 185, 189, 191, 192, 232, 272, 286, 409, 471, 502.
- ULCER, Crateriform, 77.
- Umbilical hernia, 193.
- Urethra, Rupture of, 32.
- Urethrotomy, External and internal, 32; Perineal, 8.
- Urine, Elimination of Mercury by the, 282.
- Uterine appendages, Removal of, 41.
- Uterus (see also laparo-elytrotomy, laparotomy, Cæsarean section) Non-infecting chancre of, 355; Vaginal extirpation of, 275.
- VAGINA, Extirpation of uterus through, 275.
- VAN ARSDALE, W. W., Abstracts, 74, 92.
- Review of Langenbuch on principles of military surgical dressings, 286.
- Review of Rotter on typical surgical operations on the cadaver, 285.
- Review of Seydel on antiseptic practice and trephining, 287.
- Review of Wölfler on surgical treatment of goitre, 286.
- Resection for tuberculosis of wrist, 52.
- Varicocele, 31.
- Vascular system, Surgery of, 65, 66, 67, 68, 111, 115, 147, 148, 274, 275, 307.
- Vein, see bloodvessels, hemorrhoids, varicocele.
- Ventral hernia, Operation for, 169.
- Vertebra (see also scoliosis) Fracture of fifth cervical, 156.
- Vesical, see bladder.
- WATER in peritoneal cavity during and after laparotomy to prevent shock, Use of hot, 160.
- WEIR, R. F., Four months of operative work at the New York Hospital, 31.
- Wilde's medical annual and practitioner's index, Review of, 288.
- Wölfler on surgical treatment of goitre, Review of, 286.
- Wound (see also gunshot, stab) of head, Penetrating, 69, of parenchymatous ab-

- dominal organs, 432; Review of Schaeckter on treatment of, 306; Surgery, 49, 165, 168, 324, 364, 505, 507;; Tannic acid as a dressing for, 144.
- Wrist, Neuropathic affections of, 91; Resection of, 45; Resection for tuberculous disease of, 52; Synovial cyst of, 171.
- WYETH, J. A., Ligature of internal carotid artery, 111.
- ZWEIFEL on diseases of external female genitals and lacerations of the perineum, Review of, 367.

# ANNALS OF SURGERY.

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## ON THYROIDECTOMY.

REMARKS ON THE OPERATION, WITH A REPORT OF FOUR  
SUCCESSFUL CASES.

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THE operation of thyroidectomy, amongst English-speaking communities, is infrequent enough to still offer many points of interest. It may be said, that the introduction of antiseptics into surgical practice, has led to its being more often undertaken and resulted in greater successes being attained. Before recording three successful cases of partial removal of the thyroid gland, effected by myself, and a complete extirpation, by my colleague, Mr. Solly, I would direct attention to the *technique* of the operation.

Whether the tumour is or is not altogether limited to the isthmus of the thyroid, it is best to make direct for that portion of the gland by means of a median incision, varying in length according to the dimensions of the growth. Additional skin incisions can be made subsequently, if necessary. Any large superficial veins that may appear should be divided, after a double ligature of catgut has been applied. When the capsule of the gland has been exposed, and the presence or absence of this structure will give the surgeon an idea as to whether he is attempting to remove a benign or malignant neoplasm, it should be carefully handled and if possible not torn, but incised in the middle line, so as to obtain access to the isthmus. This portion of the gland is to be surrounded by a

double carbolized silk ligature and a division made, either with a pair of scissors or a knife cutting upon a director. By this step the trachea is more or less freed and exposed, so that, if necessary, gentle pressure can be applied by an assistant to the sabre sheath wind-pipe, so as to restore somewhat the lumen of the canal, and by so relieving the stenosis minimize the difficulty of breathing—Prof. Kocher has employed this method with marked effect in several instances in which the trachea was distorted and the tumour adherent to it.

Moreover, by freeing the windpipe at the earliest possible stage of the operation, the breathing is less likely to be impeded by any future traction that may be necessary in the ablation of the tumour. The upper pedicle, containing the superior thyroid artery, is next secured by a double ligature and divided. Finally the lower and larger one, containing the inferior thyroid artery is similarly severed and the tumour removed.

If it be thought advisable to remove the whole gland, the upper and lower angles are secured on the opposite side and the remaining lobe is taken away.

In the present state of knowledge, with the uses and functions of the thyroid gland but vaguely understood, it is better, I think, to perform a partial, rather than a total, extirpation. Such a step will generally relieve all the urgent symptoms. The exposed cervical tissues are thoroughly antiseptized with carbolic or corrosive sublimate lotions, the skin flaps approximated, a drainage-tube inserted at the lowest angle and an antiseptic dressing applied. As part of the after treatment I have found the steam kettle to be a valuable adjunct, for two or three days.

CASE I. Woman, æt. 38; married. Admitted into the General Hospital May 24, 1884.

*History:* When twelve years of age, noticed a lump as large as a berry on the right side of the neck. No other member of the family similarly affected.

From its first appearance the tumour has slowly increased in size, rather more quickly during her four pregnancies. She has been treated as an out patient of the hospital by Mr. Chavasse for three and a half

years, but in spite of all remedies the neck has become larger, and suffocative feelings have become marked. These are accompanied by throbbings in the affected region and heart palpitations.

*On Admission.* The right lobe of the thyroid is much enlarged, reaching from the clavicle to the angle of the jaw and apparently twice the size of a man's clenched fist. The isthmus of the gland and also the left lobe are larger and more conspicuous than usual. Large veins are noted running over the surface of the tumour, which is firm to the feel, but movable during manipulation and deglutition. Slight exophthalmos exists, but no bruit is heard in the goitre on auscultation. On exertion the dyspnœa becomes very marked. The various viscera are free from organic disease.

May 30. A skin incision was made from a point immediately below the chin to the sternal notch, and another at right angles to this, commencing opposite the cricoid cartilage across the enlarged lobe. These flaps were dissected back. As far as possible none of the large veins were severed before double ligatures had been applied. The capsule of the gland was well marked. This was opened in the median line and the isthmus secured and divided between two carbolized silk ligatures: a double ligature was next applied to the upper pedicle and the structure divided with scissors. The lower and larger pedicle containing the inferior thyroid artery was similarly treated and the right half of the goitre removed. The wound was then washed with a warm corrosive sublimate lotion (1 to 2000), sutured, drained and dressed with sublimated gauze and bound with pads.

The trachea was found to be much compressed and presented a well marked ridge anteriorly.

The tumour, which weighed nine ounces, was found on examination to be an adenomatous enlargement of the thyroid.

The recovery of the patient was uninterrupted and on June 27 she left the hospital with the wound quite healed. She has been seen many times since, and up to the present time her health has remained good. The slight protrusion of the eyeballs has quite disappeared.

CASE II. Woman, æt. 21; married. Admitted into the General Hospital in June, 1884.

*History.* Comes of a healthy stock and never had any serious illness. Four years ago a swelling in the cervical region, "feeling something like a marble," was noted. This increased but slowly for two years. Since then the enlargement has been constant and rapid. Three months before admission she gave birth to a male child, and

from that time the goitre has caused so much dyspnœa that her medical attendant, Dr. Edwin Bull, advised a radical cure.

*On Admission.* The patient is a healthy looking young woman with the right lobe of the thyroid gland much enlarged. The isthmus and left lobe are also more prominent than normal. The circumference of the neck at the cricoid cartilage is  $16\frac{1}{2}$  inches. The tumour is elastic and freely movable, devoid of pulsation and bruit. A complaint is made of a pricking sensation on swallowing and dyspnœa on slight exertion.

There is no exophthalmos.

June 27. The right lobe of the gland was removed through a single five inch incision made in the median line. The capsule was thin and ill defined. The hæmorrhage was very slight. The antiseptic employed was corrosive sublimate. The trachea was compressed somewhat. The tumour, on examination, proved to be a cystic adenoma; one cyst holding a drachm of serous fluid being revealed on section of the parenchymatous tissue. The solid matter weighed six ounces.

The progress of the case, subsequent to operation, was all that could be desired, and by July 9, the wound was practically healed. The patient was discharged on the 17th. She has remained in good health up to the present time.

CASE III. Woman. æt. 29; married. Admitted to the General Hospital January 1, 1887.

*History.* Has been married for ten years. Two years before that event first noticed a small lump on the right side of the neck, at the seat of the present tumour. Although it steadily increased in size, it neither caused pain nor inconvenience until three years ago; then a dull aching sensation manifested itself; this was aggravated by lying down at night. For two years past has suffered from breathlessness on slight exertion, such as talking much or walking; this symptom has increased in severity in the last twelve months. For three months there has been pain and difficulty in deglutition. Patient has had four pregnancies, but never noted that there was any increase in the size of the tumour at these times.

*On Admission.* The patient is well nourished and has rather a high colour. No anæmia. The right lobe of the thyroid gland is about the size of an ordinary orange, smooth and elastic to the feel and moving freely with the trachea. No bruit is heard on auscultation. The tone of the voice is a good deal altered. The various organs of the body are apparently normal.



January 4. The enlarged lobe was removed in the usual way by a **+**-shaped incision. The capsule was quite distinct. The antiseptic employed was carbolic acid

On examination the tumour was found to be adeno-cystic. Two cysts existed. The anterior and larger one contained three ounces of serous-looking fluid; the smaller and more posterior two drachms. The solid portion of the neoplasm weighed five ounces.

The patient made a rapid recovery; for three days nourishment was mainly administered by the rectum. On January 16 she was allowed to leave her bed, and on the 27th, she left the hospital with the cervical wound quite healed.

CASE IV. Man, æt. 31; married; labourer. Admitted to the General Hospital May 31, 1883 (under my colleague, Mr. Solly).

*Family History.* A brother had a small bronchocele. *Previous History.* Had always been well and strong.

Two and a half years ago a tumour about the size of an egg was noticed in the middle line of the neck. This gradually increased until ten months ago; since then it has remained stationary. Eighteen months ago, noticed that on making any exertion, he felt short of breath. Seven months ago his wife noticed that his speech was becoming thick. Has had no difficulty in swallowing.

*On Admission.* Patient presents a uniform globular swelling in the position of the thyroid gland, elastic but not fluctuating, moving freely with the trachea, and not tender on pressure. In size it is equal to an ostrich's egg, and the skin covering it is normal.

May 11. Tumour removed by a vertical incision in the median line. It was distinctly encapsuled. The four angles of the gland were secured by carbolised silk ligatures and removal effected.

The antiseptic employed was carbolic acid. On examination, the tumour proved to be adenomatous and weighed 17½ ounces.

May 30. Patient was discharged; wound healed. He is still living apparently a healthy man, following his ordinary occupation.

*Tracheotomy during Thyroidectomy.* The cartilages of the trachea prevent the sides of the tube being approximated by atmospheric influences during respiration, and also prevent kinking during the movements of the head and neck.

The presence of a bronchocele of a solid form, by pressure causes an alteration in the direction of the windpipe: hence, the "sabre sheath" appearance described by Rose. To this

alteration, in fact a more or less stenosed condition of the trachea, the dyspnœa may mainly be attributed. During the administration of an anæsthetic, special care should be taken that the patient's neck is not stretched more than it is possible to avoid; if so, the dyspnœa will probably become alarming.

The presence of dyspnœa is an argument for exposing the isthmus of the thyroid gland as early as possible in the operation, and by this step placing the trachea well under the operator's control. If in alarm the windpipe be opened at an early stage of the proceedings, then the chances of a successful issue ultimately are reduced to a minimum. Those cases, three in number, in which I have seen such a step taken, either purposely or accidentally, have all died. Billroth's and Kocher's much larger experience tend to the same unfavorable opinion.

The performance of tracheotomy renders the employment of antiseptics useless; blood in all probability freely enters the trachea, the wound speedily becomes septic and death occurs either from broncho-pneumonia or mediastinal complications. Moreover, unless a very long tube be inserted into the trachea when opened (a lithotomy tube or a large sized soft catheter are probably the best), during each attempted inspiration the sides of the windpipe are approximated below the tracheal tube, and in watching such a patient, it is seen that really very little air reaches the lungs, although any that is present is readily expired.

Stitching the edges of the tracheal wound to the skin does not seem to help us much. Again, the open treatment necessitated by tracheotomy deprives the trachea of the support, especially the slight pressure anteriorly previously alluded to as lessening dyspnœa, which is afforded by the application of suitable dressings to the neck.

*Age* is an important factor to take into consideration when an operation is contemplated. According to some authorities, after forty the chances of a successful issue are doubtful. In two fatal cases that have lately come under notice, the one a woman, æt. 55, the other a man of the same years, in both the dyspnœa being urgent, the tumours microscopically proved



to be spindle-celled sarcomata. My own experience is too limited to state that all solid goitres showing rapid growth and marked symptoms in patients over forty are malignant, but such a condition may certainly be suspected owing to the proneness with which all neoplasm assume the degenerative types at or about that age. The difficulties of removing such a growth are very often great; although seemingly movable, the actual operation reveals that they are practically irremovable owing to their deep connections. In the case of the man referred to, the tumour entered the carotid sheath, and part of the vagus nerve implicated in the growth was taken away with it.

According to Wölffler, Professor Billroth does not find it necessary to operate upon children under ten or eleven years of age.

*Myxædema.* The occurrence of operative myxædema (cachexia strumipriva) so ably described by Reverdin and Kocher, may possibly be intimately associated with the previous family history, with the habitat, the diet and every-day surroundings of the patient. The investigations at present engaging the attention of the London Clinical Society, may throw some new light upon this important subject, but at present I am doubtful if the condition will be found to occur, after partial or complete thyroidectomy, in English-speaking patients, previously healthy, with a degree of frequency that will make it a matter of practical importance.

## PERINEAL URETHROTOMY.

REPORT OF NINE CASES OF PERINEAL SECTION OF THE  
URETHRA WITHOUT A GUIDE.

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CASE I. G. W. L., white, æt. about 45. Entered the University Hospital July 3, 1880. He had suffered from gonorrhœa in his youth, but attributed his then condition to a fall in which his perineum was much contused. After the accident his condition grew worse and worse. He suffered with retention, abscesses and inflammations, which finally compelled him to seek operative aid. His scrotum, perineum and penis presented a shapeless mass of brawny tissue which was riddled with urinary fistulæ. No water had passed through the urethra for several years. The canal was open for about five inches, but beyond that point no instrument could be passed. The fistulæ were tortuous as usual, and I could reach the bladder through none of them. The general condition of the patient was good. He could pass his water at will, but only watering-pot fashion. He readily consented to the proposed external perineal urethrotomy, and undertook to be operated on without anæsthetic. On July 4 I made a median incision from scrotal reflection to verge of anus, and slowly dividing the tissues sought for the membranous urethra. The whole region was cicatricial. I could find nothing anatomical to guide me nearer than the tuberosities of the ischia, and the prostate felt through the rectum. The patient exhibited an amount of fortitude which I have never ceased to admire, and made little or no complaint while I searched patiently and laboriously for the urethra. I continued my search for about four hours when, as my patient was becoming exhausted and I knew he could still pass his water through his various fistulæ, I thought it best to give up for the time and make another attempt later. Patient suf-

ferred considerable reaction from the operation, his afternoon temperature reaching  $104^{\circ}$  F. for some days. Three weeks later I operated again, this time under chloroform. My first operation had convinced me of the folly of seeking the urethra in the mass of cicatrix with which the perineum was filled, and I determined to go to the root of the matter at once and seek for the apex of the prostate. I began the operation as before by freely opening the perineum, then fixing the position of the prostate with the finger in the rectum, incised directly down to its apex, and opened the urethra as it emerged from the gland in just twenty minutes after the beginning of the operation. I then sought to connect the calibre of the pendulous urethra with the wound, but failed utterly in the attempt. As far as examination could teach me, the urethra seemed to be completely obliterated in all that portion which we call the "bulbo-membranous." With one instrument in the deep urethra just opened, and another in the distal portion, I could not make the two approach nearer than to within an inch and a half of each other. I was therefore compelled to desist at this point, hoping that a subsequent attempt to join the two parts might be more successful. A large, soft rubber catheter was left in the bladder, the end being closed by a stopper, so that the urine could be drawn at will. The patient made a good recovery from the operation, but I could never pass an instrument through the whole urethra. I supplied him with various tubes with which to draw his water through the perineal wound, but as it continually manifested a tendency to close I subsequently enlarged it and sewed the edges of the urethral wound to the margins of the skin incision, and so made a permanent fistula which the patient continues to use with satisfaction.

CASE II. M. B., white, *æt.* 45. Entered January 22, 1884. First had gonorrhœa twenty-three years ago, and has had a number of attacks of the same malady since, cannot say exactly when symptoms of stricture began to manifest themselves, but is sure he has had a stricture seven or eight years. Sounds were passed on him three years ago, but the prostration which followed the operation was so great that the doctor who treated him advised him to let his stricture alone. Passes his water in a very fine stream and with great difficulty. Is much reduced in flesh and strength. Has albuminuria of moderate grade. I made several patient attempts to pass an instrument, but without success, and although the patient was upon each of these occasions put under the influence of quinine, he had an alarming chill and severe fever as a consequence. The stricture was at the bulbo-membranous portion. I thought perineal section safer for this patient than con-

tinued attempts to pass instruments, and hence advised him to have it done. He consented, and on February 1 I operated before the class. The operation was done under ether and presented no particular features of interest. The perineum being normal no particular difficulty was experienced in finding the membranous urethra, which was freely opened and a No. 16 E. steel sound passed into the bladder. The stricture was cut *a posteriori* and the same sound passed through the whole length of the urethra. The hemorrhage was very moderate. No instrument was left *in situ*. The patient showed about the same reaction which had occurred after the previous attempts at catheterization and not more. The No. 16 sound was passed every few days, the wound granulated nicely, the patient improved generally, and left the hospital April 10 able to pass the sound skilfully on himself and with the perineal wound closed to a very small fistula. He reported to me May 10 with the wound entirely healed and his urine passing normally. I have seen the man lately. He works regularly at his trade, has no trouble with his water, and has had frequent satisfactory sexual intercourse.

CASE III. J. P., white, æt. 40. Entered Bay View November 6, 1884. Had gonorrhœa in 1860. Eight years later suffered from retention. This was followed by rupture of urethra and urinary infiltration. Several fistula formed then as a consequence of the first attack of retention and others formed afterwards. No urine had passed by the urethra for sixteen (16) years. His penis and scrotum were much like those parts of Case I, though his perineum was in a much better condition, and he passed his water from many points. Many of these fistulæ presented ulcerated openings and there were many excoriated and superficially ulcerated spots about the scrotum. Perineal section was proposed and accepted, and the operation done November 9. The conditions present gave promise of much difficulty, but shortly after beginning the operation I was fortunate enough to pass a fine probe through one of the fistulæ into the bladder, and this served as a guide and led me without difficulty to the urethra. The bulbo-membranous portion seemed in this case as in Case I to be obliterated, and I completed my operation by stitching the edges of the urethra<sup>1</sup> wound to the margins of the skin incision, thus making a permanent fistula. The operation was not followed by any reaction, and the patient soon began to improve in every way. The improvement was, however, transitory. The ulcerated orifices of the fistulæ and the superficial excoriations previously referred to soon began to assume a malignant aspect, and finally developed into well marked epithelioma,

and about a year later the patient died from that disease. The permanent perineal fistula which I had made for him, however, served him to the end of his days and saved him much of the suffering which would have been caused by contact of the urine with the excoriated parts.

CASE IV. J. D., white, æt. 38. Entered Bay View November 13, 1884. Ten years ago he had a fall and a heavy weight fell on his abdomen. The doctor who attended him said he had a compound fracture of some of the pelvic bones. Blood and water were drawn from his bladder. Scrotum became much swollen and turned black. He could not pass his water for two weeks, during which time it had to be drawn off. After this he could pass a little, but never a full stream. His general health is good. He suffered from retention of urine when admitted, which, all attempts to pass a catheter having failed, was relieved with the aspirator. After several days of patient attempts to pass instruments, during which time the aspirator had to be used several times, perineal section was proposed and accepted. The operation was done under ether. The usual incision was made, and the urethra was found with rather less than the usual difficulty. There was, however, apparently, no regular connection between the deep and pendulous urethra, a considerable space between the two being filled with scar tissue. I could not discover a definite canal through this tissue, but incised it freely and concluded the operation by putting a large, soft rubber catheter through the urethra into the bladder and leaving it in place. There was no particular reaction, but during the few weeks immediately following there was more or less trouble about the catheter becoming displaced. On several occasions it was necessary to pass it from the urethra through the wound and then into the bladder, as I could not pass it all the way at one time. Nor could I at any time after this operation pass a steel instrument into the bladder. The patient passed out of my care with the rubber catheter in his bladder. It came out or was taken out as I subsequently learned, and as the patient would not submit to further operative procedure at the hands of my successor, the instrument was not replaced. In November, 1885, however, during my next Bay View service, the patient returned to my care. The perineal wound remained open, and the passage of water was divided between it and the urethra. He had not suffered from retention since my operation, but his general health was somewhat reduced. November 15 he was etherized, the perineum laid open again, entrance to the bladder easily effected and the two portions of the urethra connected by a free in-



cision. At the conclusion of the operation a No. 17 E. steel sound passed without trouble through the urethra into the bladder. No reaction followed this operation. The patient was taught to use the No. 17 sound on himself and soon learned to pass it skilfully. By December 31 he was well in all respects save that a very small perineal fistula remained. I have been subsequently informed that the fistula closed entirely.

CASE V. J. R. F., white, æt. 38. Entered the hospital March 25, 1885. Has had a gonorrhœal stricture for the past twelve years. About nine years ago was examined with instruments and bled afterwards. Thinks he was cut. About five years ago was operated on by Prof. Johnston internally. Don't know whether he was cut or not, but was much improved by the operation. Has neglected himself since, and during the past eight or nine months has suffered considerably. Urine passes by drops and sometimes in a very fine stream, bladder very irritable, especially at night; has albuminuria and a certain amount of retained urine, as shown by hypogastric dulness and proved by the aspirator. April 1, a patient trial having failed to gain entrance to the bladder, and feeling that this was a case which would be greatly benefited by free incision and drainage, I proposed the perineal section. It was accepted and performed under ether in the usual manner without any notable incident occurring during its progress. The stricture which was at the bulbo-membranous portion was cut from behind and a No. 16 E. steel sound passed easily into the bladder. Patient had 10 gr. quinine and was put to bed. There was some reaction. The patient had several chills of moderate severity, but in the main did well. No. 16 E. was passed again on the third day after the operation and at proper intervals afterwards, the wound healing nicely and the general condition of the patient improving. His wound healed completely, and his capacity for sexual intercourse remained unimpaired. Having only one arm he could not be taught to use an instrument on himself, but comes regularly to the dispensary for the performance of that little ceremony.

CASE VI. V. L., colored, æt. 52. Entered the University Hospital April 26, 1886. Has had a stricture from old gonorrhœa for several years, and during the last year and a half could only urinate by "milking himself" as he expressed it. Two days before entering hospital, while straining very hard in an attempt to pass his water he felt a sudden giving way with great sense of relief to the bladder, but no passage of urine from the penis. There appeared only a few drops of blood at the meatus. Very soon he began to feel severe pain in the

penis, symphysis and perineum, and the parts began to swell rapidly. His physician, Dr. Coffroth, being called, gave him partial relief by making an incision into the perineum, through which there was some discharge of pus and urine. Pain and swelling, however, increasing the patient was removed to the hospital. The condition upon entering hospital was deplorable. The subcutaneous connective tissue of penis, scrotum, symphysis and perineum was necrotic and crackled under pressure with decomposition gases, and from the small perineal wound escaped foul-smelling urine and ichorous pus. I advised the perineal section and performed it promptly under ether, the patient consenting at once. The deep urethra having been for a long time distended was readily found, and was so large that I could pass my little finger through it into the bladder without difficulty. The stricture was cut from behind freely and a large sound passed through the whole length of the urethra. The prepuce was slit up, as it was so swollen that the meatus could not be otherwise reached. Its connective tissue was necrotic and filled with gas and pus. The subsequent progress of the patient was exceptionably satisfactory. He had but one slight chill, the wound soon assumed a healthy aspect, a No. 20 E. steel sound was passed every third or fourth day, and at the end of eighteen days he left the hospital with the wound nearly healed, feeling well and passing a full stream of water. Dr. Coffroth reports his condition after leaving hospital as perfectly satisfactory. The wound closed completely, the doctor continuing to pass sounds at intervals. He has not, however, been able to perform the sexual act since the operation, which is a source of great regret to him.

CASE VII. P. K., white, æt. 34. Entered the hospital June 3, 1886. Two days before admission he had attended a baseball match, and on returning from an out-house where he had been to pass water, walked under some of the seats. Just at this moment some of the supports gave way and a board with five men on it fell on him. The board fell across his pelvis, fracturing the left ischiac and pubic ramus and damaging him to a large extent. A short time after the accident he was seen by Prof. Tiffany in consultation with Dr. Spicer. These gentlemen diagnosticated the fracture as above mentioned together with laceration of the urethra, and advised the man to come to the hospital. This he only consented to do after a lapse of about forty-eight hours. Upon admission he was suffering much from shock. The lower part of the belly, the penis, scrotum and perineum were much swollen and ecchymosed, but presented no evidence of urinary infiltration. There was a large round tumor, dull on percussion, ex-

tending from pubis nearly to umbilicus. This tumor was, of course, the bladder, and it collapsed after forty-three ounces of urine, somewhat tinged with blood, had been drawn off with the aspirator. On the next day under ether perineal section was performed. A sound passed through the urethra was freely movable within the pelvis and hence extensive laceration was expected. The incision from scrotum to anus opened into an irregular cavity filled with blood clots. Upon removal of these the finger detected readily the seat of fracture of the pelvis. The pubic and ischiac ramus on the left side had been broken through and the lateral fragments had apparently been forced over past the median line, crushing and lacerating all the intervening soft parts. The lower attachments of the bladder were all torn away except a small shreddy mass on the right anterior side and the rectum was torn away from the prostate. In fact, the finger could be passed around the lower end of the viscus with the exception of the small shreddy mass before mentioned. After the blood clots had been washed out the bladder end of the urethra was sought for and found as an irregular tuft of lacerated tissue at the apex of the prostate gland. After incision a large catheter passed readily into the bladder and drew the urine which had collected since the day before. As the membranous urethra had been entirely torn away, it was thought best to tie a large soft catheter in the bladder for the purpose of maintaining control over the vesical end. Moreover, it was important to keep the urine out of the large irregular lacerated cavity which has been described as having been filled with blood clots. Two large rubber drainage tubes were also placed in the cavity, one on each side of the bladder, and fastened by a silver wire suture to the lower angle of the perineal wound. A large pad of oakum was placed between the legs around the drainage tubes, the end of the catheter being kept outside and above the dressing. The patient was much shocked by the operation and lay in a state of collapse for four hours during the afternoon. Finally, he reacted under appropriate treatment and passed a fair night. After this he did well. On the seventh day the drainage tubes were removed and on the tenth the retention catheter. For some days after this the patient had no control of his water, but gradually began to improve in this respect until he could retain and pass it at will. A soft catheter was occasionally passed into the bladder from the perineal wound. The patient's friends, contrary to advice, took him home June 23, twenty days after the operation, no instrument having been passed through the whole urethra in the mean time. July 21, the family physician having failed to pass an instru-



ment and the stream of urine having become somewhat small, I was called to see him. I could not pass a sound through the urethra into the bladder, but could readily effect an entrance through the perineal fistula which was not yet closed. Under ether I passed a large grooved director into the bladder with the groove upwards, and then passing a sound into the urethra so that its end rested as near as might be in the groove, cut the intervening tissue by passing a thin knife in the groove of the first instrument. The grooved director was then withdrawn and the sound slipped into the bladder. Since that I have been able to pass a No. 17 E. steel sound, and have done so occasionally. The patient's general health is fair, he passes his water freely, and although his perineal wound is not quite healed, his condition is very favorable when the extent of his injury is considered. He has had two infiltration abscesses of moderate size, one on the inner aspect of each thigh.

CASE VIII.—W. C., colored, æt. 28 years. Entered the University Hospital June 28, 1886. This patient had an old tight gonorrhœal stricture of many years standing. He had suffered many times with retention and upon six different occasions, three times by myself, it had been necessary to relieve his bladder with the aspirator. I was never at any time able to pass an instrument by the urethra. He had been advised many times to submit to operation, but had always refused and only submitted finally because I refused to aspirate him any more. The perineum was normal, and hence the operation was easy, the urethra being reached in about twenty-five minutes. The stricture at the bulbo-membranous portion was cut from behind and a large sound passed. There was considerable bleeding which was controlled by pressure. The bladder being emptied the wound was packed with wads of oakum and the legs bound together. Several hours later the pressure was removed and the patient passed water freely. The wound was left with light oakum dressing until about 4 o'clock the next morning when there was a recurrence of the hæmorrhage. The wound was again packed tightly as before and the bleeding thus controlled. This packing was left in for ten hours, a matter of small consequence to a bladder which had not been emptied for several years and was habitually distended, and at the end of that time was removed, the hæmorrhage having been effectually quelled. All went well up to the seventh day, when the patient passed some blood clots in his urine. On the tenth day secondary hæmorrhage occurred, and was controlled by packing the wound around a catheter passed into the bladder. He now began to have high temperature which seemed to be controlled by

quinine and washing out the bladder. At one time the temperature reached 106° F., and its rises and falls were characteristically sudden. The perineal wound closed to a large extent but not completely, and the patient left the hospital able to pass his water but very much broken down in health. He returned to the hospital later with lung and bowel tuberculosis and died January 11. At the post mortem examination the lungs were found riddled with cavities and the large intestine covered with tuberculous ulcerations. There was an abscess between the bladder and pubes mostly on the right side which communicated with the perineal fistula. The abscess cavity contained several ounces of pus. The perineal fistula also communicated with the urethra which canal was open all the way from meatus to bladder, and the bladder itself was much thickened and somewhat sacculated. The kidneys were normal.

CASE IX.—G. G., white, æt. 50 years. Entered the University Hospital April 21, 1886. Six months before admission and just after having urinated a heavy mass of coal fell on him fracturing his pelvis and lacerating his urethra. He was seen by Dr. G. Ellis Porter, of Lonaconing, who performed the perineal section on him, thus relieving his bladder and draining the pelvis. He suffered much as the result of his injury his life being despaired of for many days. His water passed freely during his illness from the perineal wound, and after many weeks of suffering he began to improve. His physician not being able to pass any instrument either by the penis or perineal wound called in Dr. Porter again. He met with no better success. The wound had now nearly closed, and the effects of retention began to manifest themselves. He suffered from urinary infiltration and abscesses were formed in various parts. Sometimes they would open by way of the perineal wound, sometimes in the groin, sometimes on the thigh. When the patient entered the hospital he was passing some urine through the penis, some through the perineum and some through the groin. Patient searching failed to show a passage from any of these points to the bladder. Rectal examination showed the anterior segment of the lower pelvic strait to be filled with cicatricial tissue. A sound would pass down the urethra under the pubic arch and its end would be movable when the handle was depressed between the thighs, but a catheter placed in the same position would not draw water. Moreover, the finger in the rectum showed that the sound was not in the bladder. Perineal section was attempted April 22 under ether. The usual incision was made, and, as was expected, the whole of the deep perineum found cicatricial. There were no landmarks but the

ischia and the prostate, and these were interfered with by bands of cicatrix. I aimed for the apex of the prostate and seemed to have reached it. There was a smooth canal to be seen when the blood was well sponged away. A moderate sized soft bougie entered it readily, and passed in about five inches, and I thought I had gained my point, but a catheter in the same place drew no water, and the finger in the rectum showed it was not quite in the right place. Instruments would also pass for several inches between the bladder and pubes and in various other directions, but none went into the bladder. As I had been at work something over two hours, and made no doubt but that I could reach the bladder with the patient conscious by causing him to urinate and then following up the stream, I discontinued the operation not without feeling much chagrin at having failed. The patient recovered from the operation without bad symptoms. During the next two weeks I spent hours in trying to find a passage to the bladder by the penis, perineum and groin. The patient was cheerful and courageous, and I thought especially blessed with fortitude. Sometimes my bougies would pass in at the penis and out at the wound; sometimes I would begin to think I had found a passage by the perineum when my bougie would peep out from the meatus urinarius; sometimes I would pass a small bougie its whole length in the fistula at the groin. Failing always I again attempted the section on May 10. This time I succeeded no better than before. The same bewildering labyrinth of cicatricial tissue and multiplicity of sinuses defeated my every effort. I went on more and more deeply, my exploring instruments going in almost every direction except into the bladder until so much hæmorrhage occurred that I could do no more with safety and was compelled to plug the wound and desist for the second time. The patient suffered much more from this attempt than from the first. He had considerable fever and developed a few more infiltration abscesses, one of which opened on the anterior aspect of his right thigh. He also had an attack of erysipelas from which he suffered no little. Then followed a few more attempts to reach the bladder through the wound. They were like all the rest—failures. Finally the patient determined to go home for a time with a promise, however, that he would pass a soft instrument occasionally through the penis and the wound and return later for another attempt. On January 27, 1887, the patient returned to the hospital. His condition was far worse than when he left. He had had several attacks of infiltration followed by the formation of new fistulæ; as some of the old track would close, new ones would form. There had been one at the back of the right thigh, and he had one in

each groin. The perineal fistula remained but was very small. The patient's general health was very poor; he had lost much flesh and was becoming very much discouraged. A patient but unsuccessful search as before with numerous soft bougies was made. A few days after admission he had another attack of infiltration which resulted in the formation of an abscess which was opened about an inch in front of the left tuberosity of the ischium. I now determined to make one more attempt at operation by the perineum and if unsuccessful in that to open the bladder above the pubes and pass an instrument from within outward after the manner of Mr. Howse and so attain my object. In doing the perineal operation I determined to incise freely from pubes to rectum in the median line until I had, if possible, dissected out the anterior end of the prostate from its surrounding mass of cicatrix and to seek for the urethra within the gland itself. I began by making the freest possible incision within the limits mentioned. Then passing my finger in the wound I forced it up behind the pubis and between it and the bladder reached a free vesical cavity the same into which I had passed a sound previously. Between my finger and the bladder was a dense cicatricial band which seemed about the size of my little finger. Passing my finger now into the rectum I made out another mass of cicatrix between the gut and the bladder which seemed to hold the prostate in an abnormally high position. These two bands were too deeply placed to be seen and I cut them both completely through with a probe-pointed knife guided by my finger. I then put one finger in the wound and another in the bowel and by manipulating the two with considerable force roughly tore away the adventitious tissue from around the apex of the prostate. This proceeding was not followed by much bleeding. I then had the wound drawn well open by retractors and washed it out thoroughly with a stream of hot water. Guided then by my finger in the wound I passed in a large soft catheter and pressed it against the exposed apex of the prostate, and to my great satisfaction it glided smoothly into the bladder and drew a considerable quantity of urine. I then passed a No. 17 steel sound through the urethra into the bladder. There was no particular reaction following the operation. The sound was regularly passed every few days. Within two weeks the patient was walking about and in about three weeks he returned to his home to have his cure completed by Dr. Porter.

**SUMMARY.**—There were in all nine cases in which the perineal section without guide was done as follows:

Old perineal contusion, case I,	-	-	-	-	1.
Old gonorrhœal strictures, cases II, III, V. VI and VIII,	5.				
Old pelvic fracture, cases IV and IX,	-	-	-		2.
Recent pelvic fracture, case VIII,	-	-	-	-	1.

The operation was completed at one sitting in seven cases; in two in one case, and in three in one case. All the patients recovered from the operation. Two have died since, one about a year after operation (case III) from cancer, another (case VIII) from tuberculosis of lungs and bowels six months after operation. This patient had also a prævesical abscess. In two cases it was necessary to make a permanent fistula on account of apparent obliteration of the bulbo-membranous portion of the urethra. In four cases (II, IV, V and VI) the wound closed entirely and in two (VII and IX) the wound has not yet closed, but there is a fair probability that it will in time.

Van Buren says of this operation: "Few operations in surgery are more formidable than this one of external perineal urethrotomy without a guide. The surgeon who approaches it should be thoroughly at home in the anatomy of the perineum and even then should be prepared for a possible failure." I can say no more with reference to it than that it only needs experience to make a man appreciate and concur in the view expressed by the eminent teacher. The operation requires time, light and patience, and should not be undertaken without having several hours of good daylight before one. Where there is a portion of urethra of normal size or dilated and with normal relations behind the stricture the operation will not usually be long. I have reached and opened the urethra in twenty-five minutes after making the first incision as in case VIII. But where there is much scar tissue to deal with and especially where the normal relations have been in large part obliterated as is usual in cases of old pelvic fracture or traumatic stricture generally, the landmarks are destroyed, and one must patiently feel his way through the tissues trying his probes and bougies at every possible opportunity. I have worked patiently from two to four hours as in cases I and IX only to be rewarded by failure, at least for the time.



I have usually found the hæmorrhage moderate and easily controlled by temporary pressure and hot douches, but sometimes, as in cases VII and IX, (second operation) it is not only very annoying by obscuring the field of operation but is a grave contingency when not amenable to the mild remedies just mentioned, not so much on account of the actual loss of blood as on account of the necessity of the long continued application of pressure and consequent interference with drainage. It is well to ligate any vessel within reach upon which a ligature can be placed, for as the wound is left open the number of ligatures is of no consequence, and only to use continuous pressure in cases of necessity. In the two cases in which I was compelled to employ it there were bad results in the way of infiltration and abscess which I was much inclined to attribute to its use.

In ordinary cases the drainage of the wound is perfect in the usual position of the patient in bed if the incision be made boldly and well down toward the verge of the anus. I thought it necessary in only one case to use drainage tubes. This was case VII in which there were large irregular cavities all around the bladder, which were filled with blood clots at the time of the operation and promised a bountiful supply of pus. The nature of these cases, the location of the wound, the proximity to the bowel and the constant necessity of voiding urine make it impossible to carry out the antiseptic technique which I am very fond of using under ordinary circumstances and I depend on loose and frequently changed dressings with plenty of washing and complete drainage as the next best thing.

The presence of albuminuria and other signs of kidney involvement does not contraindicate the operation. It necessarily adds to its gravity, as it does to any other surgical procedure, and perhaps more than to any other, but I am convinced that in cases of old impassable or even very tight stricture of the deep urethra where the irritability of the patient is manifested by frequent chills and high fever after each attempt to pass instruments, a free opening into the bladder and good drainage and local treatment of that viscus is good surgery and will be followed in most instances by such bene

ficial results as occurred in cases II and V. Cutting the stricture from behind is then a matter of small consequence, as for a few days, at least until the wound shall have had time to glaze over, the urine passes by the perineal opening, and the wound in the penis is left clean, a condition far different from internal urethrotomy under the same conditions. Indeed I am gradually leaning toward the opinion that there are many old hard resilient strictures through which an instrument of considerable size can be passed which would be best treated by perineal urethrotomy.

The after treatment of these cases is quite simple and based on general surgical principles. It is only rarely necessary to use a retention catheter and it should not be done when it can be avoided. I thought it necessary earlier in my experience, and used it in case I under circumstances in which I would not use it now. In case VII I thought it necessary on account of the complete severance of the bladder from all anterior connections. When used, a soft rubber instrument should be selected as less liable to collect phosphatic concretions and not so irritating to the patient's bladder. Completion of the operation should mean that the surgeon can pass a full sized sound through the urethra into the bladder, without hitch or difficulty. As the case draws to a conclusion the proper sized conical steel sound should be procured by the patient and the surgeon should carefully instruct him how to use it, for unless he continues to dilate the canal occasionally it will usually recontract and the patient will be in as bad a state as before with the addition of a new supply of cicatricial tissue.



## ON ŒSOPHAGOTOMY.

REMARKS ON THE OPERATION, WITH REPORT OF A CASE.

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ŒSOPHAGOTOMY for the removal of a foreign body impacted in the pharynx or œsophagus is now accepted amongst surgeons not only as a justifiable proceeding, but as a safe one. Aitken gives a table of 36 cases of œsophagotomy, 32 of which were for the removal of foreign bodies. Of the whole number 27 recovered, but as two were for carcinoma, we may say that of 34, 27 recovered. This is a percentage which may fairly encourage those who look upon the operation as an exceptionally dangerous one; and the cases operated on by Mr. Wheeler, while widely differing as to the cause which necessitated the operation, yet all support the conclusion that the proceeding itself is not exceptionally dangerous. There seem to be several reasons which have combined to make surgeons, otherwise bold, timid about this operation. First. No doubt, the important parts which lie in the line of incision; secondly, very little experience could be obtained by any one surgeon, as these cases are rare; but thirdly, more than all, was, I am persuaded, the delusive expectation that a foreign body fixed in the pharynx or œsophagus will be easily removed through the mouth. The sensation conveyed by touching the foreign body with a probang, or long curved forceps, is delusive to a great degree—feeling it so distinctly and so movable—as it will, to a certain extent, be found that we naturally conclude that its extraction will not be a difficult matter. Experience proves that this is much harder to accomplish than appears at first sight, and that in a large preportion

of cases it is impossible to withdraw it *safely* through the upper outlet of the gullet. The sense of mobility conveyed to the hand is deceptive, because the soft tissues in which the foreign body is impacted move with it, to a certain extent, when it is grasped.

For these reasons it happens that cases of foreign bodies impacted in the œsophagus (or very unusually at the junction of the pharynx with the œsophagus) are frequently allowed to remain a long time before the operation is resorted to. This seems to me unfortunate, and one use of the record of such cases as the one I am about to read is that surgeons may come to look at œsophagotomy not as a last resource—as the operation for strangulated hernia used to be deemed—but as a proceeding which should be resorted to as soon as a fair trial has been made, without success, of other and milder measures. Now the reasons which have led to a great and salutary change in the surgical treatment of strangulated hernia are precisely those which may with truth and equal force be urged in the practice of œsophagotomy, and these are: 1st, the insufficiency, as a rule, of non-operative means; and, 2ndly, the very serious effects and dangers of leaving the foreign body impacted in the œsophagus; and in the case of a foreign body impacted in the upper part of the œsophagus we have this advantage over the strangulated intestine—that the means to be adopted are simple and readily done, and there need be no delay in putting them into practice. I mean extraction by forceps. Once given the position of the body, the question of the possibility of its extraction by the forceps will soon be decided. As in the efforts to reduce the hernia, so here, any prolonged and forcible efforts will certainly do harm, and may jeopardise the patient; so that a short and gentle trial with various forceps is all that good surgery will endorse, and this failing, as I have shown it will often do, then it is at once the safest and the quickest method to place the patient fully under an anæsthetic, and, having made one more trial with the forceps, to proceed to perform œsophagotomy.

The after-treatment is often difficult. The case that I am about to relate had more than its share of difficulty; but the

question of feeding will always be a trouble, and I think this may be lessened by considering beforehand the best methods. No absolute rule can be laid down applicable to all cases, but I think in a majority it will be found that feeding the patient by tube, not through the mouth, *but through the wound*, is the safest and best method. This, of course, presupposes that we fail to obtain primary union, but it is only in the cases where primary union has not been obtained that difficulties of feeding arise, and in these I advocate the introduction of a catheter, or rubber tube, through the wound, and twice a day the injection of suitable fluid food into the stomach.

CASE.—On the morning of July 13, 1886, as I was seeing my children patients in the Madelene ward, I heard a peculiar sound which instantly caused me to look round to see from whence it came. The sound was a cough—a very peculiar, ringing, laryngeal cough, and yet it was not at all croupy; a throatish sound it was, but not exactly corresponding to any of the well known throat coughs. I perceived that the sound which had caught my ear came from a miserable-looking little child, who was being held in her mother's arms at the door of the ward. The mother, who was the opposite of miserable, being very fat and sonsy, came forward at once at a sign from me, and said she had come to ask my opinion about her child who, three months previously, had swallowed a steel roller belonging to her sewing machine—the fellow of which she showed me—it was a double steel plate, in size somewhat larger than a sixpence; the two plates separated by a roller, and with a hole through the middle. She gave me the following history: She had lost several children from different causes; this child was born with a blood-mark over the whole left side of her face, and partial paralysis of her right arm and leg, and was of a fretful, irritable temper, supposed not to be “all there,” and yet the mother prized her and petted her. Three months before the day she was speaking to me, the child, who had a strange cunning and mischief about her, got hold of this steel roller and put it into her mouth; the mother at once suspected that she had swallowed it, more particularly from the purple, choking state she was in. She at once brought the child to

the Mater Misericordiæ Hospital; where she saw Dr. Dwyer. The father, a warder in Mountjoy Prison, then subsequently sought the advice of Dr. Tate, the surgeon of the prison, who carefully examined the child and gave it as his opinion that the roller had passed into the stomach. He probably attributed the signs of throat trouble to the injury done in swallowing the roller. Dr. Tate continued to attend the child, and afterwards, in his absence, another surgeon constantly visited her, but neither of them seem to have had any doubt as to the situation of the foreign body, although the mother sometimes ventured to suggest that it might still be in the throat. It appears that I had attended some of her family, and she had originally proposed bringing the child to me, but was overruled by her husband. Now, however, three months having elapsed, and the child's symptoms growing worse rather than better, she determined to delay no longer, and hence her visit to the hospital on July 13. Upon examination externally, I felt in the left side of the neck, on a level with the cornua of the os hyoides, a hard, fixed, irregular body, which seemed to me was probably the lost steel roller. A careful examination internally confirmed this opinion, for, the child's mouth being held wide open with Fergusson's gag, I passed the forefinger of the left hand down into the pharynx, and distinctly felt the sharp edge of some metallic substance; the spot where I felt this corresponded with the spot externally where the hard substance had been already discovered. The diagnosis as to the position of the foreign body was thus complete. The next step was its removal. As it felt to the point of the finger very fixed, and the examination had already much distressed the little patient, further proceedings were postponed until next day; both mother and child being admitted to the hospital.

Next morning, July 14, having secured the assistance of my colleagues, Mr. Heuston, Mr. Scott and Dr. Bewley—Mr. Franks was out of town—I proceeded to remove the foreign body—determined to accomplish this if possible through the mouth, but, failing this, to perform pharyngotomy or œsophagotomy. The patient was placed under the influence of chloroform, and I began by placing Fergusson's gag in the mouth,

and handing this to Dr. Bewley, I then passed down a long curved forceps, with deeply serrated points, and touched the metal roller; it seemed at first certain that, as this was easily done, it could be removed in this way, but it was not so, either the forceps slipped off, or, when I obtained a particularly good grip, the metal body proved to be so firmly fixed in its place that it was impossible to move it. Mr. Heuston and Mr. Scott both tried with the same negative result. So I then proceeded to remove it by external opening.

I made an incision two inches long along the anterior border of the sterno-mastoid muscle, its centre corresponding to the cornua of the os hyoides; this exposed the sheath of the carotid artery, which was carefully opened, and the vessels drawn outwards. A curved forceps was now passed through the mouth into the pharynx, and firmly pressed against the foreign body, which made it protrude towards the wound—this was a valuable guide. I carefully scraped through the back wall of the sheath and came down on the steel roller. The opening I had made into the mucous membrane of the pharynx was so small that the roller was, with much difficulty, brought through it after the manner of working a stud through a button-hole which is too small for it. But I abstained from enlarging the opening for the reason that I felt certain that the smaller the opening into the pharynx the greater likelihood was there of immediate union, and the occurrence of a fistula subsequently.

As soon as the foreign body had been safely extracted, the deep wound was brought together by hidden antiseptic sutures—first the mucous membrane by two sutures, then fascia, the muscles, fascia again and skin. Two drops of glycerole of nepenthe was administered hypodermically, and a beef tea enema, with a few drops of brandy was thrown into the rectum.

I have said that the child had a blood-mark on her face, and was partially paralysed; but I did not know until the day after the operation that she was an epileptic also. During the twenty-four hours which followed the operation she had about twenty fits, some of them very severe, some slight. She vomited frequently, the antiseptic dressings were torn from the wound and the contents of the stomach forcibly ejected through it.



The first thing to be done when this state of things was discovered on the morning after the operation, was to control the fits by the free use of the bromides. But here another difficulty arose. Swallowing was difficult and tedious, and always caused the fluid which was passing down to escape to some extent from the wound. However, five grains of mixed bromides was taken three times in the day, but still the fits continued, although lessened. The dose was increased to ten grains three times a day, and then the fits ceased. Some of this was probably lost, as part was administered with beef-tea enemas, but nearly this quantity was taken.

When the wound opened up, saliva flowed out through it in great quantities, and any fluid which was attempted to be swallowed passed freely out through it. I determined to make another attempt to close the wound, so placing the little patient fully under the influence of chloroform I carefully cleansed the wound, and catching the cut edges of the mucous membrane of the pharynx in a forceps I stitched them closely together, and then did the same for the sides of the wound and the skin, employing fine iron and silver wire—over all an antiseptic pad and bandage. The result of this operation was to limit very much the escape through the wound, but not entirely to stop it, but from this time the case, as far as the wound went, was more manageable, and plainly tended to success. I now began to feed the child by passing a flexible tube down from the mouth past the wound, and nearly into the stomach, and injecting through this tube strong beef essence, as much as half a pint being thus given twice a day; a little would be regurgitated up through the lower angle of the wound, but not much. For two or three days this was done, and then it had to be abandoned on account of the irritation produced in the pharynx by the passage of the tube; but I found the passage of a flexible tube *through the wound* to the stomach caused no irritation, and so twice a day the child was fed by this means; rectal alimentation was also continued, but as it was only secondary twice a day was enough, and the help thus gained was important. No further epileptic fits occurred, but the emaciation was extreme, and bed-sores



formed, despite the greatest care, on the most prominent points of pressure. By the end of August the wound had contracted to the size of a No. 10 catheter, and the child's condition was improving daily. The mother then took her home, and I did not see her again until October 5, when she brought her to see me—or to be seen of me. I found the wound *firmly* and *evenly* united, the child was in all respects in good health, the sores on the back had all healed and scarcely left a mark. When tested as to the powers of deglutition and of swallowing solids and fluids, I found she could do both very well, but her mother told me that sometimes fluids regurgitated through the nose. The child had a more healthy look than she had when I first saw her, which was when the foreign body had been lodged in the pharynx for *three months*.

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ABNORMAL FRANGIBILITY AND DELAYED AND  
NON-UNION OF FRACTURES OF THE LONG  
BONES IN PERSONS SUFFERING FROM  
GENERAL PARESIS OF THE INSANE.

BY JOHN HARVEY GIRDNER, A.B.M.D.,

OF NEW YORK.

AUTHORS of text books which treat of fractures of the long bones invariably divide the causes of delayed union and of non-union of these fractures into two heads, viz., constitutional and local. They have with equal uniformity failed to include among the constitutional causes what I have found to be a most important one, viz.: *General paresis of the insane*. This fact is not surprising, nor are the authors to be censured for this omission, when it is remembered that it is only within the last ten to fifteen years, that general paresis has been recognized as a distinct and peculiar form of disease of the brain and nervous system, with a perfectly characteristic history and pathology. Doubtless an even more potent reason for this seeming neglect is the fact that, men interested in

surgery and accustomed to study diseases and injuries from a surgeon's standpoint, rarely have the opportunity to observe a large number of cases of general paresis for any considerable length of time; cases of this kind are generally inmates of asylums for the insane, and such surgical aid as they require, or receive, is at the hands of the gentlemen composing the medical staffs of those institutions, who are specialists in psychology, hence have no interest in any surgical peculiarities which the disease may present.

My attention was attracted to this subject during two years and a half service as assistant physician to an asylum for the insane, in which there were about seventeen hundred adult male inmates. There were certain wards set apart as a general hospital, for the separate treatment of the physical diseases and injuries of these insane men, and I was in charge of this department. As is well known, one of the symptoms of general paresis is a gradual and slowly advancing paralysis of all the muscles of the body. As the muscles of locomotion become affected, these patients are subject to frequent falls, and in this way, the percentage of fractures is greater among them than among men in any other circumstances; and further, I am satisfied that a far less degree of force will produce a fracture in a paretic than would be required to cause the same injury in a person in ordinary health. This disease which expresses itself in the muscular system by partial paralysis, indicates its presence in the osseous system by an unnatural frangibility. Not only are patients suffering from general paresis, greatly predisposed to fractures; but to greatly delayed union, soft fibrous union, or more frequently, complete non-union is the rule and osseous union the exception.

It might be said that the difficulties to be overcome in placing the fragments in position, and keeping them there, are greater where the patient's mental condition is such as to render him unable to cooperate with the surgeon in his efforts to make a perfect limb. This is true to a certain extent; but it is not so important a factor in treating fractures in insane patients as one unacquainted with this class would be likely to suppose, and besides, I found this very class—general paretics

—more manageable under these circumstances than patients with most of the other forms of insanity. No further evidence is needed to show that it is the disease itself, and not lack of coöperation on the part of the patient, when I say that I was always able to obtain bony union, and generally made useful limbs, when the patients suffered from any of the other forms of insanity, such as acute or chronic mania, etc., etc., in nearly all of which, it is more difficult to properly adjust and immobilize the fragments, owing to the restlessness of the patient, than in cases of general paresis.

General paresis is frequently insidious in its attack, and the pathological changes may advance for months and years before the nature of the disease is recognized, or the mind become sufficiently affected to make it necessary to remove the patient to an institution for the insane. Especially is this the case when the fibrous degeneration begins in the spinal cord and lower ganglia of the brain, It is during this period, that the surgeon, called upon to treat a fracture in such a case, may be greatly puzzled to explain the cause of non-union in the absence of any apparent cause and be unjustly censured for a result which he could in no way avert. In all cases of non-union of fractures in adult male patients, surgeons should always examine carefully for the earlier symptoms of general paresis and bear in mind, that in such cases, non union or soft fibrous union is the rule, and firm bony union the rare exception.

# REPORT OF FOUR MONTHS' OPERATIVE WORK AT THE NEW YORK HOSPITAL.<sup>1</sup>

[CONCLUDED.]

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IN the genito-urinary subdivision of operations on the trunk there were twenty-four cases. Among these was one of *varicocele*, treated by a method which has been suggested by me elsewhere as suitable for varicoceles of large size—that is, by ablation of the scrotum and subsequent ligation of the veins, which are then exposed and easily accessible, care being taken not to tie the venous plexus accompanying the vas deferens.<sup>2</sup>

Besides this, two cases of *double hydrocele* were treated by Volkmann's method, as they were considered too large to be cured by the carbolic acid injection of Levis, which is still considered the best treatment for a hydrocele of ordinary size, or even for one of large size, if it is first diminished by a preliminary tapping.

*Double castration* was performed in one instance for tuberculous disease of both epididymes and testes, which had resisted the usual treatment (including scraping with the sharp spoon and subsequent packing with iodoform), and the patient insisted on being relieved of them. Enough of the diseased scrotum was preserved to give the parts a semblance of their original condition. Notwithstanding the fact that pains were taken to excise them as high as possible, it was found that the vas deferens on the left side was filled with cheesy pus. No deposits existed in the prostate, nor were there any renal or pulmonary symptoms.

*Amputation of the penis* for epithelioma was performed once, in a man æt. sixty, the organ being removed close to the scrotum by a single sweep of a long knife, the incision running obliquely so that the corpus spongiosum was left longer than the rest of the structures. The portion

<sup>1</sup>Read before the New York Surgical Society, Feb. 9, 1887. Concluded from Vol. V., p. 517.

<sup>2</sup>On "Varicocele." "Med. Record," March 20, 1886.

of the urethra that remained was divided in a downward direction for a distance of half an inch, and the mucous membrane and skin were sewn together. All bleeding vessels in the corpora cavernosa, and elsewhere, were ligated with catgut, and then the edges of the sheath of the penis were united by several catgut sutures, the skin being also sutured over this. A catheter was introduced into the bladder (as the man had been in the habit of using one on account of his having an enlarged prostate), and the stump of the penis, covered as it was by skin, was inclosed in an iodoform dressing secured by a firm bandage, through which the catheter projected, to end in a glass urinal.

Primary union was obtained. This was unusual and was to be attributed to two things: the easy retention of the catheter, and the compression, as well as the final arrest of the usual persistent oozing, by the union of the edges of the fibrous sheath of the penis. A row of glands in the left groin was also extirpated, as advised by Küster, but under the microscope these were found to be enlarged simply from inflammation. Their removal, however, added nothing to the difficulty or risk of the operation, and should, in my judgment, be undertaken in every case.

*Internal urethrotomy* for deep and tight urethral strictures was practiced in nine cases, in two of which a single perineal fistula existed. In two other cases, in which multiple perineal fistulæ were associated with an urethral stricture, *external urethrotomy* was performed, and in one instance, where a fistula communicated with the rectum, about one inch and a half from the anus, the perineal wound was purposely extended so as to divide the bridge of rectal tissue, with a satisfactory issue. In all the urethral operations it is the custom to smear the hair of the pubes and perinæum with iodoformized oil (four grains to the ounce of fluid cosmoline), and to inject a small syringeful of the same into the urethra before any instruments are introduced into the canal. All these latter are greased with iodoformized vaseline (a drachm to the ounce), which is less subject to chemical change than the oil. For the division of deep and even tight anterior strictures I rely on Maisonneuve's urethrotome, the blade of which (cutting upward) I have had enlarged to a breadth of eleven millimetres; even with this a cut made in the usual manner will enlarge the canal only enough to admit a No. 26 French sound, but, by twisting the handle of the instrument as it is withdrawn from beyond the already divided stricture, a second incision may be made in the roof of the urethra. By this means enlargement to 32 or 34 of the French scale, and sometimes greater, can be attained. If any considerable anterior obstructions are met with, they are removed by Otis's urethrotome.



After everything has been divided, including the meatus urinarius, the urine is drawn, and the bladder is washed out several times with a 1-to10.000 bichloride solution, and the urethra is also freely irrigated with the same as the catheter is withdrawn. If any anterior strictures have been divided, the penis is firmly bandaged, and the patient is given two or three times during the first twenty-four hours one-eighth of a grain of morphine with from three to five minims of tincture of aconite root. No instrument is passed until four to seven days have elapsed, and not even then if there is any elevation of temperature. In this way urethral fever has been practically abolished, and for this reason this method of procedure has been detailed at length. Before leaving the hospital every patient with stricture is provided with a proper sound and is taught its use.

*External urethrotomy* was performed in a case of recent *rupture of the urethra*, which is caused by the patient's falling astride of a step-ladder, by cutting into a mass of extravasated blood, in which were found the torn, jagged ends of the membranous urethra. The proximal end of the urethra was more clearly recognized after the prolonged use of a hotwater douche, which stopped the oozing of fresh blood and also washed away the obscuring clots etc., when the urethra appeared white and sharply defined.

This expedient I had found useful in several other cases in which difficulty had previously been experienced in distinguishing the position of the urethra. The prompt employment of an incision in cases of ruptured urethra is well recognized as one of the decided modern improvements in surgery.

The patient in question did well.

*Lateral cystotomy* was performed once for the relief of an obdurate cystitis (not of the tubercular origin, as shown by frequent microscopical examination for bacilli), which followed a stricture, and had been unrelieved by an internal urethrotomy which had satisfactorily widened the urethra. This is to be preferred to the median cystotomy, as the drainage of the bladder is more thorough. In the median method, a tube carried into the bladder to continuously drain it is not always well borne, though I have had better luck when the tube has been passed in on the third or fourth day after the first traumatic effects had passed off, than when inserted and left in at the time of operation. This case is not yet completed, though the improvement is marked; at the end of three weeks a tube was inserted, as the wound was rapidly closing.

One case of *litholapaxy* for a phosphatic stone, weighing one hundred and ninety grains, with a uric-acid nucleus, can be reported in



a youth of sixteen. Bigelow's large lithotrite was used. Recovery was rapid.

Of more interest was a case of *suprapubic cystotomy for supposed tumor* which operation was done in a young man of twenty-four, who had been passing bloody urine for eight months previous, with moderate pain and increased frequency.

There was no enlargement of the prostate nor renal tenderness detected. A searcher in the bladder failed to touch a calculus. No renal elements were found in microscopically examining the urine, nor was any portion of a tumor cast off, though repeated search was made among the many small clots passed. His pain in the bladder on sudden motion became more marked, and he was early in December last placed under ether, and the bladder thoroughly examined by the bimanual method, also by the sound and lithotrite, and also by Bigelow's aspirator. No calculus was found, nor were evidences of a tumor obtained. One mass removed showed a small collection of shapeless epithelial cells, but no stroma. It was decided to explore the bladder by the suprapubic incision; this was done December 23, after the rectum had been distended with a bag holding eight ounces of water,<sup>1</sup> and then the bladder was first filled with six ounces and a half of 1-to-100 carbolic acid solution but, as no distinct elevation of the bladder above the pubes could be felt, three ounces and a half more were slowly introduced, when the top of the bladder was lifted one inch and a half above the bone. The bladder was reached by the usual incision, and was opened with but little hæmorrhage. The exploring finger did not find any calculus nor any tumor, as was expected. Inspection of the bladder was rendered difficult by the great rigidity of the strongly developed recti muscles, acting as they did more than usual, owing to the difficulty in maintaining perfect anæsthesia. By introducing blunt retractors into the bladder wound, and by raising the heels of the patient over an attendant's shoulders, as suggested by Trendelenburg, I was enabled to secure, with the additional aid of a small portable electric light, a very good view of the bladder. Only an intensely congested and easily bleeding mucous membrane was seen. No attempt was made to sew up the wound, which was packed lightly with sticky iodoform gauze, after a drainage-tube had been inserted; the patient was turned on alternate sides for three days, when the tube was also removed. No reaction followed the operation, but bloody urine continued to be passed,

<sup>1</sup> See remarks on this point in "Medical News," December 4, 1886.

and two weeks later, the wound still admitting a finger, the patient was again etherized with the idea of isolating the mouths of the ureters, and thus ascertaining whether the hæmorrhage came from the kidneys or not. This was soon proved to be a difficult affair; the use of various endoscopic tubes and mirrors, and even a long but narrow glass speculum, was inefficacious in furnishing the desired view, and the insertion of, and dilatation by, Peterson's rectal bag with seven ounces and a half of water, while it brought the base of the bladder one inch nearer the surface and closer to the pubes, did not serve to permit the recognition of the orifices of the ureters. The hindrance was, as before, mainly due to the difficulty of overcoming by ether the strong resistance of the well-developed recti muscles. It was, however, seen that the lower part of the bladder was studded over with a number of elevations the size of hemp seed, which bled freely when rubbed by an instrument. Three weeks later the suprapubic opening closed, and the patient's urine is becoming less bloody, but the diagnosis of the case can hardly be considered as made. He still remains under observation.

On the *kidney* a series of important operations have been resorted to. The first case of the number to which your attention is asked is one of

*Laceration of the kidney, with perinephritic abscess and renal fistulæ*, which occurred in a youth of twenty, who, three years before coming under my care, had fallen a distance of six or eight feet, and struck his right side heavily on an iron bar. He had following this severe hæmaturia for three weeks, when fever, local pain, swelling, etc., showed that suppuration was progressing in the right lumbar region. An incision was then made by my colleague, Dr. W. T. Bull, and a large amount of pus was evacuated. A sinus persisted for a long time, which healed at times, but would break out again and freely discharge matter. Since July last he has been unable to get about by reason of the pain in the flank and also in the rectum. In the left iliac fossa was found much inflammatory hardness and tenderness, running upward to a large fistulous opening between the middle of the iliac crest and the ribs. Through the opening a probe could be passed nine inches downward to the iliac fossa. Above the opening, nearer the spine, was another, through which a probe entered four inches toward the kidney. From four to six ounces of pus were daily discharged. The patient was pale, but in fair condition, and was anxious to have relief from the persistent suppuration. By the rectum nothing could be felt. The urine was slightly albuminous, but otherwise the exam-

ination was a negative one, with the exception of a few pus-cells. The amount discharged per diem was between fifty and sixty ounces. No urinary salts were found in the pus discharged from the fistulæ. A curved incision, starting from the upper fistula and running through the lower one, and anterior to it (somewhat like the one advised by Koenig), was used to expose the parts; but the tissues were so matted together by old inflammatory action as to yield but little room for manipulation. Instead of finding myself (as the way was finally enlarged by stretching and cutting) in the expected cavity of a suppurating kidney or thickened perinephritic abscess, I came down upon a thin-walled cavity, larger than my fist, through which could be easily felt the movements of the abdominal viscera beyond. Moderate bleeding occurred from the cavity, and it was temporarily stopped with sponges, while the fistulous track in the groin was opened at its terminus, just above Poupart's ligament. A second track was then found, running from the first downward to the pelvis, but too far back to be tapped. A drainage-tube was placed in each of these tracks, the sponges were removed, and the cavity was inspected with the aid of the electric lamp. This disclosed to me that a rent three inches long had been made through the membrane, so that the liver and gall-bladder were plainly exposed. This probably would not have been detected had it not been for the lamp. It was sewed up by catgut sutures. Careful examination by myself and my colleagues failed to find any remains of the kidney, which I also sought for through the peritoneal opening before it was closed. The exposed cavity was packed partly with iodoform gauze, but mainly with sublimate gauze, and the usual peat-bag and other antiseptic dressings were placed over all. Death took place four days later, with marked rise of temperature about forty-eight hours after the operation, followed by persistent vomiting and almost total suppression of urine. At the autopsy there were no signs of peritonitis; the left kidney was in a condition of acute suppurative interstitial nephritis, and on its surface, underneath its capsule, pus was diffusely distributed. At the upper border of the tenth rib on the right side, surrounded by dense connective tissue, was seen the upper third of the right kidney, its lower two-thirds having been destroyed. This kidney-stump formed the upper limit of the abscess cavity, which had been opened at the operation. In it were found two sponges which had been left *in situ*, one of which was firmly adherent. It should be stated that on the day of his death, the date of the last dressing, the wound was in an odorless condition. This cavity was bounded internally by the duodenum and spine, anteriorly by the ascending colon

and hepatic flexure, and below it communicated by a tortuous sinus with a pus cavity in the true pelvis, behind and alongside of the bladder and rectum, and it extended also through the right sacro-sciatic notch, and terminated exterior to this in a cavity the size of a hen's egg.

The second case of renal surgery was one of huge suppurating kidney, for which *nephrotomy* was done.

The patient, a man, æt. thirty-seven, had, strangely enough, had symptoms of trouble in his side for four weeks, and these were of moderate severity, but were associated with great weakness and rapid emaciation, but no chills nor any special urinary manifestations. In the right flank was a painful tumor the size of a cocoanut, half way to the ilium, with a deep sense of fluctuation, which the corroborative use of a hypodermic needle proved to be from retained pus. An incision was made (under the idea that the swelling was more probably a perinephritic abscess) from the distal end of the twelfth rib downward, and, instead of reaching evidences of inflammatory thickening as the cut was deepened, only the translucent peritoneum came into view, through which was seen the tumor moving perceptibly up and down under the action of the diaphragm. An incision at right angles to the first, and running toward the spine up to the quadratus muscle, soon exposed the tumor more safely in another place, when its purplish color proved it to be a hugely distended kidney. It was not washed out, but two large rubber drainage tubes were inserted, and the wound was dressed antiseptically. Though the discharge at first was very free, and required frequent changes of the dressing, it has of late rapidly diminished, and the patient's condition has correspondingly improved, though at times a strong urinous odor is perceived in the discharge. The cavity was washed out afterward with Thiersch's boro-salicylate solution, as being safer than a carbolic or sublimate solution.

The case, however, that excited the most interest in the whole of the present operative group, from its nature, treatment, and result, has been one of *abdominal nephrectomy* for a huge *adenoma*, a disease which has necessitated removal of the kidney in only one (Czerny) of Gross's collection of forty-nine cases of nephrectomy for neoplasms. Another has since been published by Albert. In Czerny's<sup>1</sup> case the right kidney was involved in a child eleven months old. Death took place from peritonitis on the second day. In Albert's<sup>2</sup> the patient

<sup>1</sup> "Deutsche med. Wochenschrift," 1882, No. 32.

<sup>2</sup> Brodeur, "De l'intervention chirurgicale dans les affections du rein," 1886, p. 222. Also "Wiener med. Presse," 1885, No. 9.

was a woman of forty-one, who, two years before, had had a fall, followed by frequent hæmaturia. Pawlik catheterized the ureters, and made the differential diagnosis. The tumor, as large as a child's head, was extirpated by a posterior incision, and the patient recovered. A third successful case is also reported by Schönborn<sup>1</sup> in a child aged two years.

A burly man, aged thirty-five, a butcher, was suddenly seized, two years since, with cutting pain in the left lumbar region, and at that time passed a quantity of bloody urine; this was probably an attack of renal calculus, for other paroxysms came on with not very long intervals, and he frequently noticed that gravel was passed, and indeed he showed me some fifteen or twenty calculi, principally phosphatic in character, when he was first brought to me by his physician, Dr. Maynard, of this city. In the past year, however, these intermittent attacks have culminated in a persistent pain in the left lumbar region, which is aggravated by sudden motion—by riding, etc., jolting will, moreover, bring on or increase his hæmaturia. He has lost flesh in the last six months, and he has become blanched from loss of blood. In the left flank is to be felt a tumor, running from three inches external to and on a level with the umbilicus, upward and backward under the ribs. This is slightly movable on bimanual examination; the mass seems to be nearly seven inches thick. The amount of urine passed varied from thirty-five to sixty ounces *per diem*, and, on examination, showed nothing beyond what might be due to the blood mixed in it. Under the idea that kidney enlargement might be due to retained calculi, an exploratory vertical incision, as for *nephrectomy*, was made in the left loin December 11, 1886, and the kidney, covered only by a thin layer of its fat capsule, was exposed by tearing through this. No calculus could be felt, though the posterior surface was pretty thoroughly palpated, and the anterior surface only to a limited degree. A puncture with a needle was made in several places, but did not discover any calculus nor any cavity. The bleeding from the punctures was free, but was soon checked. The examination also showed that the kidney was too much enlarged to be removed by the usual lumbar incision.

It was determined to do nothing further for him at this time, but, when the lumbar wound should have healed, it was decided that the tumor (for the diagnosis made was that of probable sarcoma) should be extirpated by abdominal section. And in the meanwhile, as

<sup>1</sup>De Jong, "Beiträge zur Nieren-Extirpation," Heidelberg, 1885. Also "Centralblatt f. Chir.," 1885, S. 24, Beilage.



a corroborative diagnostic means, the quantity of the urea daily passed was estimated a number of times, as had been suggested by Thiriar, who had noticed that in malignant growths this secretion was materially lessened. It was found in the patient's case to have fallen to between 219 and 240 grains *per diem*. On the twentieth day of January, 1887, the patient was again etherized, and by an incision 5 inches and a half long, to the outer side of the left rectus muscle, and starting from the free edge of the ribs, the abdomen was opened, and, after palpating the other kidney, the intestines were pushed aside with large, flat sponges, the peritoneum covering the tumor was incised to the inner side of the descending colon, and the affected kidney was exposed. A few minutes' dissection with the finger allowed the root of the kidney to be reached, when this was easily surrounded with a heavy silk ligature, by means of Mott's aneurism needle, and the vessels and ureter were tied off *en masse*. A heavy clamp was then applied between the ligature and the kidney, and the latter was cut away, and, after some tedious tearing of cicatricial adhesions on its posterior surface resulting from the first incision, it was finally removed. The clamp was found to have slipped, and to have allowed a vein, which had entered the kidney above the ligature to bleed freely. This showed most happily the control the anterior incision gives in this respect. The bleeding vessel was distinctly seen, and was in a moment controlled by a fresh clamp and ligated. Very little blood was lost, though during the stripping process, which was conducted between the capsule and its fibro-adipose envelope, for a short time quite a smart oozing of venous blood took place. A long dressing-forceps was then forced from in front through the old cicatrized track to the loin, and a large-sized rubber drain was carried in from this point to the cavity left after the extraction of the kidney. The divided and torn edges of the peritoneum which had covered the kidney were united by numerous Lembert sutures, thus inverting the edges, and, after a final toilette of the peritoneal cavity (but only so in name, as nothing had entered it, it having been so thoroughly protected by the sponges), the parietal peritoneum was sewn together with catgut and the abdominal wall was closed by silver wire sutures, supplemented by additional ones of catgut. As some oozing of blood persisted from the drainage-tube, several yards of sublimate and iodoform bandage were stuffed into the posterior cavity, and over all peat-bags and other antiseptic dressings were applied. The patient's progress was extremely satisfactory; there were no peritoneal symptoms, and only a persistent gulping for seventy-two hours. No attempt was made to introduce food into the stomach, and for a week



nourishment was administered by the rectum. The highest temperature by the mouth was  $101.7^{\circ}$ . The urine for the first twenty-four hours amounted to but eight ounces, and it was very bloody, due probably to the operation of the removed kidney. In the second twenty-four hours it was twenty ounces and was of a dark amber color, with only traces of blood in it; urea 1.01 per cent., specific gravity 1.020. On the third day it amounted to forty-nine ounces, and on the fourth to eighty-eight ounces, after which it gradually subsided, and about fifty ounces are now passed, but the urea still keeps lower than normal, but there is more than before the operation. On the sixth day the dressings were changed, and the wire sutures were removed from the anterior wound, which had healed primarily, and from the posterior opening the gauze was pulled out, everything being sweet and aseptic. To-day (February 8) the patient is sitting up out of bed, is eating heartily, and is on the road to health.

An episode occurred at the termination of the operation that excited some anxiety. On telling the nurse to count her sponges at the close of the operation, she reported that there were two flat ones missing, there being seven instead of the nine original ones; on a second count the same result was had, and this original number was corroborated by the superintendent of the training-school, who was present. The wound, which was then partially closed, was opened, the hand was introduced, and the abdominal cavity was explored, and Dr. Bull, who was assisting me, was requested to verify the search. No sponges were found in this examination, and the closure of the wound was proceeded with. The means for caring for the soiled towels, etc., and for washing the sponges, seemed to be so exact, and there seemed to be so little possibility of the missing sponges being lost anywhere else than in the patient's belly, that I felt much concern during the first three or four days on this point, being prepared, on the first symptom of peritonitis fairly manifesting itself, to reopen the abdominal cavity and resume the search. This feeling was present because, though an examination was found to be negative when made by two surgeons, yet I was conscious of the difficulty of absolutely excluding their presence, as I could not be certain of such regions as beyond the lesser omentum and behind the liver. Events proved, however, that the sponges went elsewhere, although the possibility of the organization of aseptic sponges may be insisted upon by some.

The kidney, when removed, weighed twenty-one ounces, and measured nine inches by five and a half. Its shape was rendered irregular by several projections from its surface, which were marked on its posterior

aspect. While the kidney itself is much enlarged, there can be seen after section that its substance has been invaded by a neoplasm of the size of a fist, encroaching upon, but not bursting by ulceration into, the pelvis. The mucous membrane of the latter is thickened, and up to the point where it was severed from the ureter, numerous miliary granules were found beneath it. Uninvolved kidney-tissue was found between the ligature and the tumor. On examination by the microscope, made by Dr. Peabody, the pathologist, the tumor "seemed to be nowhere continuous with the kidney tissue, but to be separated from it by a well defined capsule. In the more recently developed portions of the tumor an indistinct stroma of connective tissue may be made out, inclosing alveoli that are lined with cuboidal cells. The stroma itself is very rich in young cells, and its vessels are large and thin-walled. Older parts of the tumor show very delicate fibrous stroma, and also contain many round and spindle cells inclosing alveoli, some of which are large enough to be seen with the naked eye, while others are of microscopic size. The alveoli are lined regularly with flat epithelium, and occasionally contain colloid material. They are nowhere filled with cells. From the sides of many of these alveolar walls buds of connective tissue covered with epithelium project into the alveoli, and there either terminate freely or effect a union with similar buds projecting from an opposite wall. Not many vessels are seen in the fully developed parts of the tumor. In sections from different parts of the kidney, not actually invaded by the tumor, the effects of prolonged pressure are seen; also small, round cells occur abundantly in sharply defined aggregations. Diagnosis; adenoma."

To be added to this eminently satisfactory case is another of *laparotomy for perforation of the appendix vermiformis*, done on probably the fourth day after the fæcal extravasation, with a fatal result, and already reported to the society.<sup>1</sup> A third case of *laparotomy* in a married woman, æt. 35, is also to be reported. It was performed for the arrest of severe hæmorrhage due to a *uterine fibroid* reaching nearly to the umbilicus. The uterine appendages (normal tubes and ovaries) on each side were tied off and removed, and the operation was completed smoothly and quickly, and under all antiseptic precaution. Peritonitis, however, carried off the patient on the fourth day.

A fourth case of *laparotomy* has much more interest, as it was performed upon a married woman of 40 who had had a centrally situated abdominal tumor for several years, which she had been told

<sup>1</sup>"Medical News," January 15, 1887.

by a distinguished gynaecologist was a fibroid, who added that she should never let any surgeon touch her.

Five days prior to entering the hospital she had been seized with severe abdominal pain, with fever and slight vomiting; when seen there was dulness running up from the pubes to the umbilicus, which rounded out, apparently a fibroid; *per vaginam* the lower part of the uterus could be mapped out, but the upper part could not. It was thought unwise to introduce the uterine probe. Pulse, 120; temperature, 102°; and belly moderately tympanitic, except over the tumor and toward the right iliac fossa, where, however, no fulness could be felt. A fine exploring needle was passed in by the house physician, Dr. Vought, and a small quantity of sero-pus was drawn out. The patient was accordingly transferred to the surgical division for operation, as it was supposed to be suppurative peritonitis with a large uterine fibroid. The patient, however, adhered to the injunction given her, and refused to have any surgical interference until twenty-four hours later, during which time her pulse rose to 140 and her temperature to 104°, and her general condition was much deteriorated. After the antiseptic washings had been done, a median section, running from the umbilicus to the pubes, showed that a suppurating cyst, rising nearly to the transverse colon, of the size of a muskmelon, containing horribly foetid gas and pus, existed, the origin of which could not be made out, it being lost in the uterus, nor could both of the ovaries be located. Whether there was a suppurating ovarian cyst or a fibro-cyst of the uterus could not be distinguished. The treatment was clear—*i. e.*, to fasten it to the lower angle of the wound, after drawing out as much as could readily emerge, and to close up the remainder of the abdominal wound. This was done, securing the sac not only with sutures to the peritoneally lined abdominal wound, but also with two transverse pins, and then the sac, which had only been previously tapped to empty it of its gas, in order to allow easier handling, and then had been tied up again, was freely opened with the patient on her side, and was thoroughly washed out with 1-to-40 carbolic solution, and drained by a large glass tube carried through a mass of iodoform gauze. By washing out the sac cavity with 1-to-100 carbolic solution every three hours, the patient went along smoothly, with falling temperature and pulse, until the fifth day, when from a normal temperature it quickly rose to 103°. This was thought to be due to a mural abscess on each side of the wound, which was freely opened, cleaned out, and packed with iodoform gauze. The edges of the sac seemed to be adherent, but had sunk, after removal of the pins on the

third day, quite deep in the wound. Some foul-smelling gas came out during this washing out of the suppurating cavity, and the next morning the vagina was found filled with feces. The patient rapidly succumbed forty-eight hours later, with signs of general peritonitis. The autopsy showed that the operative diagnosis was wrong. The cyst was Fallopian, and communicated by old openings with the rectum and bladder. The drawing up of the sac into the wound apparently made these openings more direct and patent. Peritoneal infection was probably late, for at the operation none was recognized. The size of this pyosalpinx was much beyond my previous knowledge.

THE SURGERY OF THE EXTREMITIES comprises thirty-two operations. Among these, eleven were for necrosis, five of the femur, two of the tibia, one of the fibula (external malleolus). One of the os calcis, one of a beautiful central necrosis) accidentally omitted in the foregoing pages) of the sacro-iliac synchondrosis, where a large mass of separate dead bone was taken away by extensive chiseling. There was one of the lower end of the humerus, involving the *elbow*, which was *resected*, resulting in good motion. One case of *resection of the entire tibia* was made in a boy of thirteen, who had suppuration progressing in the leg for over six weeks, and in whom the tibia had been largely exposed by incisions made for his relief in another hospital.

On his admission to the New York Hospital the knee joint was found to be involved, and, as an amputation was declined, the joint was opened and drained and the tibia found to be loosened in its sheath, so that but little chiseling and cutting sufficed to remove it from one epiphysis to another. The ankle joint was also involved in the suppuration. The patient's weak condition did not bear the shock of this operation, more severe, however, in appearance than in reality. The sawn bone showed several separate purulent depots and extensive infiltration of acute inflammatory processes.

I venture, notwithstanding the length that my paper has assumed, to make a remark concerning the subject of *necrosis of the lower end of the femur*. I have made myself, and have seen others make, an error in treating this affection, that I think I have now learned to avoid. The point is, when much thickening exists at the lower end of the femur, not to be content with the removal of the piece of exposed dead bone that may be seized and extracted, but to boldly chisel into the thickened end of the bone, even though no opening is found running into it. In very many instances further trouble may be found existing, either in the shape of minute spiculated necrosed pieces, as was shown by Dr. Lange at our last meeting, or of larger pieces surrounded

by a spongy suppurating involucrum, or even central spongy necrosis, with or without bone abscess, running dangerously near the joint-line. All of these I have found when least expected. I feel warranted, therefore, in urging this point. In five cases where extensive openings had been made into bone, recourse was had to the suggestion made public by Schede in 1885, and also, in 1884, by Dr. R. T. Morris, of this city, but originated several years earlier by Neuber, of allowing the cavity to fill up with blood, in order that this may organize under the antiseptic dressings applied. Either the wound of the soft parts must be closed with the exception of a small slit, or it must be left entirely open and covered with a layer of gutta-percha tissue, with a hole in it; this is intended to allow the surplus to flow out, and also to prevent the dry bandage from entirely soaking up the clot. In three out of my five cases (which can be increased to five out of seven, counting two private cases) success was obtained in the prompt organization of the clot and the rapid healing of this wound, which under the old plan of packing, heals but slowly from the bottom.

A peculiar painful *enlargement of the internal conayle of the left femur*, with old joint disease, was found in a young man upon which an osteotomy was done with a gouge and chisel, in the expectation of finding a bone abscess; but, though the mass was cut into to a depth of three inches (it being larger than a big apple), nothing abnormal was seen, nor did the microscope show any change in the osseous structure. Nevertheless, the pain ceased and the patient was cured.

*Arthrotomy* for the removal of a floating sarcoma of the knee was performed in one instance; the case, together with the result of the microscopical examination, was reported to the society at a previous meeting.

*A recurring sarcoma of the groin*, the size of a large orange, encountered in a middle-aged man, was removed, the common femoral artery and vein being exposed, but not disturbed by the dissection.

*Antiseptic irrigation of the knee-joint* with 1-to-20 carbolic solution, for chronic hydrarthrosis of the knee, can be reported as successfully done. Likewise a quite extensive *chronic tendo-synovitis of the peroneal tendons* was treated by making an opening above and below, and establishing drainage, without a very satisfactory outcome, the reason being microscopically shown to be (as Koenig has taught us) owing to tubercular infection of the sheath. It will require opening throughout its whole extent, and thorough dissection, scraping, and cleaning, with subsequent iodoform packing, in order to effect a cure.

Beside the elbow-joint resection, practiced for necrosis involving the



articulation, and already noticed, there was one *resection of the shoulder joint* in a young adult by Ollier's anterior incision, which was an unwise selection of an operative method, as it allowed only a very imperfect cleaning out from the joint of the tuberculous synovial membrane. Even the more usual cut across the deltoid would have hardly permitted this to be done satisfactorily. As the patient had then slight (and now more advanced) signs of phthisis pulmonalis, amputation at the shoulder joint will soon be demanded for his relief.

A *resection of the wrist joint* after Lister's method was done for early tuberculous arthritis. In this instance more than usual trouble resulted from the hæmorrhage so often induced by the use of Esmarch's rubber bandage. The case promises well, though the long pressure to control the bleeding caused a slight cellulitis of the forearm. I have since in one instance put into use, with gratifying effect, the suggestion made at this society by Dr. Lange, that, when producing rubber anæmia, one should control the rush of blood into the limb after the removal of the constricting band by the pressure of an assistant's finger on the main artery above the wound, so that the full blood supply is only gradually admitted to the limb, and in this way contraction of the temporarily paralyzed vessels is permitted.

*Resection of the astragalo-scaphoid articulation* was performed four times in two patients *for aggravated flat-foot*. In three of these operations adherence to Ogston's original plan was followed of shaving off, after opening the joint, the articular cartilages with a chisel, and then fastening the bones together by ivory pegs driven through the scaphoid bone into the astragalus. In the remaining operation a little more than the articular cartilage was taken away, and the use of pins was omitted, according to Stokes's method. The rectified position was maintained easily by a plaster bandage without the support of pegs. The result in the first case, now over four months old, is excellent; the last case is too recent to be quoted. I did this for the first time in 1885 in one foot, following, without intending it, Stokes's method—that is to say, removing more than I started to do—and in the second foot I conducted the operation more strictly after Ogston's directions. Only I found that my ivory pegs had been soaked all night in sublimate solution, which rendered them so friable that I could not use them, and so I drove in two gilt nails which had been cleaned by scrubbing and immersion in carbolic solution, but were stained by a previous employment in a compound fracture. Whether it was from this or from some other cause, the foot went sadly wrong, the other, without a peg, progressing happily. Severe tarsal inflammation ensued,



and the young man only got off with a total resection of the scaphoid and astragalus and parts of the cuboid and os calcis, leaving him, however, in the end a serviceable foot, but prolonging his convalescence for months.

*Amputation of the leg* was done for recurring cancer of the heel by Stephen Smith's method, and gave a beautiful stump. The patient at first declined amputation, and consented only to my doing the Wladimirow-Miculicz operation. She acted wisely, I think, in coming to the decision she finally did, for she was past fifty-five, and the chances of the more complicated operation would have been thereby more lessened, and a relapse would have been more likely to occur.

The rather rare operation of *amputation at the hip joint* was performed by the long anterior and short posterior flap, in a man æt. forty-six, for huge recurring sarcoma of the soft parts of the left thigh. Besides a large mass reaching nearly to the trochanter on the side and behind, there were several small growths lower down on the face of the thigh. The original removal had been done three years ago by the late Dr. Post, of this city. Recurrence took place six months after this operation. The main tumor is now some ten inches in diameter. The hæmorrhage at the hip-amputation was admirably controlled by Lloyd's method, which is to fasten a doubled rubber bandage tightly around the hip, so that it rests on the inner side of the tuberosity of the ischium, its ends being secured above the ilium at about its middle. Pads are placed under the compressing band, over the lower end of the external iliac artery, and over the sciatic notch. It appears to be the best and least hazardous of the many methods advised to control the blood-supply in this high amputation. Next to it I should place Davy's rectal rod. Not more than two or three ounces of blood were lost in this case.

The patient did well without any temperature-elevation for forty-eight hours, when signs of gastritis and tympanites came on, without diarrhœa and he died four days after the operation; at the autopsy the stump was found to be progressing satisfactorily. A large aortic aneurism was found, and the stomach was studded with patches varying in size from a silver quarter to a silver dollar, in which the mucous membrane was blackened and destroyed; their edges were sharply defined and they were of embolic origin, and were supposed to have originated from the aneurism. The intestines were distended and much congested in defined areas.

My own impression is, that the toxic effect of the bichloride can probably be blamed. At least I am conscious that I committed an er-

ror, which I had in other instances sedulously kept in view. After the stump had been finally closed, to make certain that the drainage tubes were free from coagula, I allowed a 1 to 5,000 sublimate solution to flow in through one tube, distend the stump and to flow out through the other tube, when the dressings, (also of sublimate and quite freshly made, *i. e.*, damp) were applied in large quantity. I speak of this injection of a closed wound as faulty, since I can attribute the production of carbolic acid poisoning to a similar method several years since. The gastric appearances somewhat resembled those shown in the case of the death after the operation for removal of the uterine appendages, although there frank peritonitis existed. In this case, to cleanse the vagina after the use of a tampon, a rather strong sublimate solution was directed by the house surgeon. It is well known that absorption of this drug goes on with special aptitude in the genital passages of the female.

I must here confess that, in spite of the many advantages of corrosive sublimate as an antiseptic, more mishaps have occurred to me in using it than were met with in the days of carbolic acid, and that with iodoform, since I have learned to use it discreetly, no harm has come at all beyond an occasional local irritation.

The few remarks that need to be made concerning the *antiseptic methods* usually employed in operations at the New York Hospital can appropriately be set forth here.

All fresh wounds are irrigated lightly with 1 to 5,000 or 1 to 10,000 sublimate solution. Catgut, either sublimated or Kocher's, is used. Iodoform, when used, is either dusted on the line of union of a wound or on the sublimate gauze or peat-bag, which is first placed over the wound. No iodoform gauze (made by rubbing iodoform into a sticky gauze of any kind) is employed except to stuff cavities. Where primary union is sought, it will, if used, often shut up the secretions and provoke trouble. Where special promptness of union is desired, I much like to place over the wound a layer of sublimated, matted spun-glass, a device of Kümmel's. Over the antiseptic gauze is laid a heavy layer of absorbent cotton, and pressure is made with gauze and Canton flannel bandages. Drainage-tubes are of rubber and are kept in sublimate solutions; they are dipped in iodoform dissolved in ether just before being inserted into a wound. They are removed as early as possible, from the second to the fifth day. As to the surgeon himself and his assistants, thorough scouring of the hands with soap and subsequent immersion in a 1 to 1,000 sublimate solution or a 1 to 20 carbolic acid solution is resorted to.

The instruments are scrubbed and boiled, and are then put into carbolic solution. Sponges are washed in soft soap, and are kept in strong sublimate solution (1 to 2,000); all those which have been soiled with bad pus or discharges are at once destroyed.

To return and complete in a few words the list of operations that have taken so long to detail, I beg to speak of two cases of popliteal aneurism treated by *ligature of the femoral artery*, with primary healing of the wound in each instance, but with a slight phlebitis in the leg in one case, and an enormous femoral abscess in the second, from suppuration of the sac due to the patient's leaving the house one month after the operation. I had in the first case reverted to ligature after successfully managing seven cases of aneurism of the lower limbs by Esmarch's bandage, with one failure. The later successes by the ligature and its greater certainty, and increasing trust in antiseptic measures, led me to change my views from the bloodless to the cutting operation. It is too slight an experience from which to arrive at conviction, but it carries home, like my unfortunate Ogston's operation, the feeling, as Dr. Hunt, of Philadelphia, banteringly says, that "antiseptic surgery is *not* cock-sure surgery."

One case of *ununited fracture of the femur*, where the treatment of rubbing the ends together till pain was produced, and then putting the man up in plaster and getting him about on crutches, bearing light weight on the limb, had failed, was *bored* by Brainerd's drills.

A case of a nine-weeks-old *dislocation of the femur into the thyroid foramen* came under my notice in October in a woman weighing over two hundred and fifty pounds. In making efforts to reduce the dislocation under ether, the neck of the femur gave way and allowed ready restoration of the limb to a position parallel to its fellow. I had accidentally done what I proposed to do more exactly with a chisel, had I failed to reduce the dislocation. When the patient left the hospital, the case gave promise of a very satisfactory result.

By mentioning, in closing the list, one case of the very small operation of Cotting's for an *ingrowing toe nail*, it is hoped that the artistic diminuendo will be appreciated. Minor operations have purposely been omitted, save in one or two instances, where their introduction would justify a remark. This operation of Cotting's often fails, and I have learned from my clinical assistant, Dr. Hartley, how to do it better than I formerly did. I now cut off much more of the swollen flesh alongside the nail, plunging the knife downward, and sometimes inclining it toward the center of the toe, so that a generous lump can be taken away; the incision should run well back beyond the matrix. An

iodoform dressing is applied, and over this cotton and a snug bandage, and with this the patient can keep on walking, with the toe exposed in the shoe. In a week, usually, the dressing is changed. Lastly, of the three hundred and ninety-nine patients treated, there were seven deaths (or 1.75 per cent. mortality), and in each of these an operation had been done. In five of the seven, death occurred soon after the operation; in two other cases death resulted some time later, as in the case of the patient with tumor of the brain, who lived two and a half months after the operation, and the patient with hernia, who died three weeks after the operation, from pneumonia and Bright's disease. In the one hundred and five operated on, the mortality was 6.66 per cent.

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## LAPAROTOMY FOR PERFORATING PISTOL-SHOT WOUND OF THE ABDOMEN—RECOVERY.

By JOHN I. SKELLY, M.D.,

OF POTOMAC, ILL.

**C**HAS. W. M., bank cashier, æt. 21 years, was brought into my office at 11:30 A. M., March 12, ult., on account of wounds received a few minutes previous. He was helped to a chair but was unable to sit up, and was compelled to lean against the wall to keep from falling off the chair. I discovered that he was bleeding from a wound in the right hip and wounds in both hands. He was pale as a corpse, and complained of pain in the right iliac region. It was impossible to make a satisfactory examination in the office, so I had him conveyed to his home, one mile distant. His clothing was removed, a hypodermic of morphia administered, and a more careful examination made.

Patient very tall; weight 190 pounds; of tubercular cachexia, cavity in right apex; body reasonably well nourished; face, neck and breast covered with dark colored papular eruptions; head and shoulders inclined forward; umbilicus retracted, and abdomen very tender but not at all distended. Six bullet wounds were found—one through terminal phalanx of right little finger; one through proximal phalanx of right middle finger, ranging upward through hand; one through proximal phalanx of left index finger; one just cutting through integument above right

ilium; one in dorsum of right hip, and the worst of all in right iliac fossa, about midway and half an inch below a line drawn from umbilicus to anterior superior spinous process of right ilium. He complained only of the latter wound—said the pain was “unbearable,” “was killing him by inches” and insisted that something be speedily done for his relief. The nature of the injury was explained to him, as also the necessity for an operation which would involve abdominal section, and thorough investigation of the status of the abdominal viscera. He readily consented, and begged me to proceed at once.

Operation—Never perhaps since the days of antiseptics has an operation of this kind been undertaken under more unfavorable circumstances. No one expected it. Nothing was prepared for it. I had but one medical man to assist me, and he made no pretensions to surgery. He readily agreed that patient would soon die if let alone, and very cautiously admonished me to “let him alone.” My timidity was not sufficient to overcome my sense of duty, so I proceeded to operate. Chloroform was administered and an exploration of the wound undertaken. The probe would not pass beyond the muscular tissue. An incision was made in the median line from the umbilicus to one inch above pubes. The parts were carefully divided down to the peritoneum which was nicked with scissors and divided on a grooved director. The wound in linea alba was also enlarged upon the director. The intestines were carefully draw out and held in warm dry towels (not aseptic). Blood vessels of bowels and omentum deeply engorged. The omentum was studded with tubercle in nodules from the size of a pin head to a small pea. A careful examination of the intestines showed that they were intact. The bullet had ranged upward and inward, entering the abdominal cavity about three inches from point of contact. Blood was oozing from the wound in the inner wall at point of entrance into abdominal cavity. This was readily stopped by pressure with thumb and finger, the thumb outside. There was a collection of venous blood in the cavity—extra-peritoneal, and a slight abrasion of the peritoneum where the bullet struck it when it entered the cavity. The bullet lodged near the spine without doing any damage to the viscera. The abrasion in the peritoneum was dusted with iodoform. The blood removed by sponges (new ones hurriedly washed out in carbolized rain water). The peritoneum closed with carbolized catgut sutures, dusted with iodoform, and the wound in the linea alba similarly treated, taking care not to penetrate the muscular tissue with the sutures, and finally the wound in integument was closed with interrupted silk sutures one-half inch apart, dusted with iodoform and



supported by strips of adhesive plaster. A warm towel was now placed over the abdomen and the patient was quietly placed in bed within one hour from the receipt of his injuries. Pulse and temperature could not be accurately taken before the anæsthetic was administered on account of the great restlessness of the patient. When put to bed temperature was  $99\frac{1}{2}^{\circ}$ , pulse 130. When he rallied from the anæsthetic he said he was entirely free from pain and remained so up to the twelfth day, when he had some trouble from accumulation of flatus. He vomited three or four times during the first night after the operation. On the twelfth day he took a dose of castor oil with ten drops of turpentine, which removed the accumulated flatus, and thoroughly moved his bowels for the first time. The wound was thoroughly healed in one week without a drop of pus. He was kept in bed twenty-one days and the urine drawn with a catheter. He could not void his urine lying down.

He is now, May 1, sound and well, and has been going around since the twenty-first day. Three bones in hand and fingers were shot through, but all healed under a single iodoform dressing. The wound in the hip gave him no trouble after the bleeding was stopped. The bullets could not be found. I was greatly surprised to find the intestine not wounded. The patient was standing squarely in front of his assailant and but twenty feet distant. The weapon used was a 32-calibre. The ball that entered the abdomen passed through fifteen thicknesses of clothing and the index finger of the left hand.

Notwithstanding the intestines were not wounded, my patient was liable to death from three other sources: internal hæmorrhage, blood poisoning, and peritonitis. This entirely leaves out the impending shock—which it seemed must prove speedily fatal. The operation had a decidedly calmative effect on the patient, for when assured that the intestines were not wounded he said: "If that be true I shall surely get well."



## EDITORIAL ARTICLES.

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### THE OPERATIVE RESULTS IN CASES OF TUBERCULOUS DISEASE OF THE WRISTS AND OF THE TESTICLES.

In an article on "Modified Resection for Tuberculous Disease of the Wrist," which is published by Dr. O. Fahrenbach, of Goettingen, in the *Deutsche Zeitschrift f. Chirurgie*, December, 1886, (Bd. 25, Hft. 1 and 2), the author publishes twenty-eight cases, in which resection of the wrist was performed for tuberculous disease at the surgical clinic in Goettingen (Prof. Koenig), and proceeds to analyse them with a view to determining the value of the operation in its final curative effect, and in order more accurately to recognize the indications for resection.

The operations were all performed between the years 1875 and 1885 (March) and the author has been at considerable pains to ascertain the final condition of all the patients operated upon.

Tuberculous processes of the wrist begin, in the opinion of the author, with very few exceptions in the carpus, and not in the radius nor ulna. In fact the radio-carpal articulation is the less likely to be pathologically affected, as it is anatomically distinct from the carpal articulations. But whether, in cases where the bases of the second and third metacarpal bones are affected, the disease most frequently begins in the metacarpal or in the carpal bones cannot yet be definitely decided.

The method of operating adopted at the Goettingen Clinic is based upon this observation, that the carpus is generally primarily attacked. A dorsal incision after Langenbeck is made, after application of Es-march's bandage, and the carpal articulation opened on the radial side of the index extensor-tendon. After pulling aside the tendons with retractors, the carpal bones are removed by means of a large Volk-mann's spoon, as may appear indicated. This act is rendered more or less easy of performance, according to the progress of the disease

Finally all affected soft tissues as well as portions of approximate bones are removed, and the cavity irrigated, iodoformised, drained and antiseptically dressed.

The hand is maintained in a position of dorsal flexion, at first by the starched bandage, afterwards by a suitable apparatus of steel and leather. Passive movements of the fingers are continued from the third to the sixth week.

In a few (6) cases typical resection after Langenbeck was performed. In twenty-two cases the whole carpus was removed in the manner above described, although the bones were not all affected.

In eighteen cases the affections were complicated by fistulæ and abscesses; in ten cases no such complications existed. No deaths occurred; recovery took place within a period varying from one month to a year in those cases in which the result could be ascertained. In five cases nothing could be learned. In sixteen cases a small fistula remained, not, however, interfering with the use of the hand. Three cases did not recover; two died, two and six months respectively after operation, in consequence of tuberculous affections. Secondary amputations were not necessary, but smaller operations such as curetting the fistulæ, etc., were resorted to in six cases. In one case amputation was done by other surgeons.

As to the final results achieved the author states that in no case did perfectly normal function result. In two cases the hand had a nearly normal function. In eleven cases the patient could use his hand to work in the field, or for writing, playing on the piano, playing billiards, etc. In three cases the function was more seriously impaired, and in three further cases the hand could only be used for holding things.

Motion to the extent of  $20^{\circ}$  to  $35^{\circ}$  generally returned in the wrist, as regards flexion and extension.

In no one case could any general infection of the system with tubercle virus be traced to the operation, nor does the author believe that the general health of patients was ever seriously impaired by the longer duration of the recovery after resection than after amputation, since in those cases where fistulæ remained the secretion was minimal.

The mortality percentage after resection of the wrist does not ma-

terially differ from that after resections of other joints for tuberculous disease, and a number of deaths are certain to occur, in the opinion of the author, for the reason that tuberculous disease of the wrist is to be viewed as a metastasis or local expression of a general disease.

As to the final results of exsection of the wrist, the author believes them to be equally as good as those of other joints; and resection is by far preferable to amputation, as any description of hand possesses immense advantages over a stump.

Contrary to Bidder and Schede the author insists on the importance of removing the entire carpus in resections of the wrist, whether all the bones are diseased or not. Only by this means can good results be obtained, as illustrated by the results of Ollier and those of Koenig under consideration. Equally important is it to maintain dorsal flexion during the whole time of healing and for some time after by means of suitable contrivances. The use of iodoform is also recommended for its specific influence upon tuberculous disease.

W. W. VAN ARSDALE.

*The Results of Castration for Tuberculosis of the Testicle*—A. Finckh publishes some statistics on a basis of twenty-nine cases of castration performed for tuberculosis of the testicle in the surgical clinic at Tuebingen.<sup>1</sup> In some cases the time of observation after the operation extended to thirty years. and at the least to one year.

He warns against the partial extirpation of the testicle, which has been recommended by some, to preserve for the patient the "illusion" of virility, rightly claiming that it is impossible to be certain that the rest of the testicle is really healthy, and with respect to psychic effect of castration, he quotes the case reported by Simmonds (*Arch. f. klin. Med.*, Bd. xxxviii., p. 585) in which double castration for tuberculosis relieved the patient of decided hysterical symptoms.

The epididymis is the most frequent starting point for the tubercular process, much less frequently the body of the testicle, and only now and then the seminal vesicles, or the prostate. The infection

<sup>1</sup> Ueber die Endresultate der Castration bei Hodentuberkulose. A. Finckh, *Beitraege z. klin. Chirurgie*, P. Bruns, Bd. ii., p. 407.

very rarely descends from the kidney to the genital organs. The tuberculosis frequently spreads from the epididymis to the body of the testicle, and sometimes to the tunica and the scrotal tissues. The tunica is often the seat of miliary tubercles. The infection may extend along the vas deferens to the prostate and seminal vesicles, and it may reach the testicle of the other side, by descending its vas deferens. But out of eight cases in which double castration was performed, Finckh found the vas deferens healthy on both sides at the time of operation in five, and in two it was diseased only upon one side. In the remaining case both cords were tuberculous, and on one side the changes extended within the pelvis, so that some diseased tissue was left after extirpation, and yet the patient lived twenty-three years after. In like manner, Simmonds (*loc. cit.*) found the prostate healthy in three cases out of five of tuberculosis of the epididymis of both testicles, consequently the disease must have had an independent origin upon both sides, or the infection was able to pass through the prostate without affecting it. The existence of disease in both testicles, then, does not prove that the intra-pelvic parts are involved, and even if they are, recovery is possible although the whole diseased tissue cannot be removed—therefore the opinion held by some, that castration is contraindicated when the tuberculosis exists upon both sides, is erroneous.

It has generally been supposed that if the intra-pelvic parts of the genital organs were tuberculous, the prognosis was hopeless, and yet in seven cases in which some diseased tissue had to be left in the cord, none had recurrence—the elapsed time of observation after operation being 24, 6, 5, 3, 2 and 1 [2 cases] years. Finckh does not seem to be familiar with the fact that in the two cases of spontaneous recovery from tuberculosis of the testicle, proven by autopsy, quoted by Reclus,<sup>1</sup> the prostate was involved when the process was at its height. Unfortunately Finckh does not give any facts as to the prognosis when castration is not performed.

The youngest of Finckh's cases was 8 years old, the next 18, the oldest 63. Of the 29 cases 6 died subsequently of tuberculosis of

<sup>1</sup> Du Tubercule du Testicule, P. Reclus. Paris, 1876.

various organs, but no local recurrence was noted. One of these cases died of miliary tuberculosis three weeks after the operation. The longest duration of life of these six cases was four years, and adopting this period as the extreme limit during which recurrence is to be expected, there are 13 cases which can be set against them, in which no recurrence took place within that time.

The duration of the disease at the time of operation is not considered, but from the accompanying histories of the cases we learn that in the six cases which died of tuberculosis, the duration of the disease before operation was 1 month, 6 months, 18 months, 2 years (2 cases), and in one case not given. Of the other cases there are seven in which the duration was over one year (in two cases, three years), all remaining free from tuberculosis five years after the operation. Therefore long duration does not necessarily contraindicate castration. Only one case died from the operation, an old man, of "exhaustion."

B. FARQUHAR CURTIS.

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#### PATHOLOGICAL DISLOCATIONS—THEIR ETIOLOGY.

A very useful collection of the facts, and discussion of the theories, as to the etiology of the pathological or spontaneous dislocations has been made by Forgue and Maubrac.<sup>1</sup> Volkmann divided these dislocations into those produced by stretching of the ligaments, those produced by destruction of the articular parts of the bones, and those produced by deformity of those parts due to other changes than are caused by suppuration and granulation. This classification is objectionable because it puts together the deformities of the articulations caused by caries sicca, and by disease of the spinal cord; and because it separates the former (really tubercular) lesion, from the other varieties of tuberculosis.

Our authors distinguish between the dislocations occurring when the bones are healthy, and those in which the bones are altered—thus

<sup>1</sup>Des luxations pathologiques—leur pathogenie, Forgue and Maubrac, Demarquay prize essay, Soc. de Chirurgie, Paris, 1885.

combining Volkmann's two last classes in one. Of the variety in which the lesions are confined to the soft parts constituting the joint, two classes are made—those in which the soft parts have been previously healthy, and only altered by slow mechanical action; and those in which the soft parts have been primarily affected. This distinction seems unnecessary, for dislocation cannot take place while the ligaments are normal, and it is not important to determine whether some slowly acting cause produced at the same time an elongation of the ligaments and the dislocation, or whether the ligaments were first elongated and the dislocation occurred subsequently.

In the first of these subdivisions are grouped the dislocations due to over-extension of the ligaments, to the pressure of neighboring tumors, to the unequal growth of two bones coupled together, to vicious position of the bones—as in genu valgum, and to professional or trade habits.

Under the second subdivision come dislocations due to a previous traumatism, voluntary dislocations—a previous laxity of the ligaments being assumed, dislocations due to paralysis, and those which occur in any inflammation of the joints in which the bone is not involved. These forms present many problems as yet unsolved. Not the least difficult of these problems is the dislocation which has been observed to take place some weeks after a contusion or sprain of a joint, no displacement having occurred at the time of the accident, and no joint disease having developed.

It is not clear why the voluntary dislocations should be included here and separated from dislocations caused by such feeble mechanical agencies as professional habits, for it seems more rational to assume a redundancy, or an unusual elasticity of the ligaments in these cases, with an unusual amount of control over the muscles about the joint, enabling the individual to suspend their instinctive defensive contractions, than any pathological change in the ligamentous tissues, as do the authors.

Two cases are known in which a paralysis of all the muscles about a joint—the hip, has caused dislocations. But the most frequent mode of action of paralysis in producing displacement is by the contraction



of one group of muscles, aided by the position of the limb, when their antagonists are paralyzed. Thus, if the extensors and outward rotators of the hip are paralyzed, the flexors and adductors will produce a dislocation upon the dorsum. If the latter groups are weak, the dislocation will be pubic, as in the case reported by Bradford. In the shoulder these dislocations are rare, for the scapula and clavicle are not fixed, and the weight of the arm is the only force acting to displace the head of the humerus.

Dislocations in inflammation of the joints, the bones remaining unaffected, have been observed in simple (traumatic) arthritis, in acute rheumatism, in the arthritis of infectious disease—especially typhoid fever, and in tuberculous fungous synovitis. They are explained by the over-action of one group of muscles, aided by position and the weakening of their antagonists—the way having been prepared by distention of the capsule with effusion, and by softening of the ligaments due to the inflammatory changes in their tissue or to maceration. The position of the limb may be the result of the endeavor of the patient to avoid pain—choosing either that angle at which the intra-capsular pressure is least, or that in which the joint can be most firmly held by its muscles and best guarded against sudden movement. The position of the limb determines the direction of the displacement. These facts, fortified by two cases in which dislocation of the knee and hip in acute rheumatism were the direct result of a faulty position, maintained for a long time, emphasize the necessity for regulating the position of the limbs even in the treatment of this common complaint. Another practical point to be noted in these cases is the relief to the pain brought by the occurrence of the dislocation, which indicates that the displacement relieves some sort of pressure, although in one case the dislocation took place when the joint was not distended by fluid, so that actual distention of the capsule is not a necessary factor in producing the accident.

Coming to the second main variety of pathological dislocations, that in which the bones are altered, we find the teachings of Koenig and Volkmann on the pathology of tuberculosis closely followed. All the varieties of dislocation occurring in tubercular joint disease are con-

sidered in turn; the simple form, a true dislocation; the form in which the articular ends are destroyed, the capsule remaining; the perforation of the cotyloid cavity by the head of the femur; the form caused by enlargement of the head of the femur; and the "emigration" of the articulation as a whole. The changes of *caries sicca* are also noticed here.

Chronic rheumatic arthritis (*A. Deformans*) destroys the ends of the bones, surrounds the articulations with projecting osteophytes, weakens some muscles and contracts others, and is sometimes accompanied by joint effusions. These changes frequently cause subluxations and sometimes complete dislocation. There may even be emigration of an articulation. Dislocations are also found in chronic rheumatism of the hands, and in the rare fibrous rheumatism described by Jaccoud and Besnier.

The dislocations occurring in locomotor ataxy are fully discussed from the standpoint taken by Charcot.<sup>1</sup> The authors reach the following conclusions: In ataxy there occurs a rarefying osteitis, especially of the epiphyses, caused by some trophic spinal influence, which in extreme cases results in destruction of the ends of the bones, and is the primary cause of dislocation. Secondary causes are traumatism, and unequal pressure upon the bones and ligaments caused by muscular inco-ordination—rendered more injurious by the lack of sensibility to pain. They suggest the hypothesis that the bone lesions are due to syphilis, which is looked upon by so many as the cause of the alteration in the spinal cord.

In syphilis without nervous disease severe arthritis is found, and even dislocation; and our authors consider these to be secondary to syphilitic disease of the bones. The work closes with a brief study of dislocations due to simple deformity of the articular ends of the bones, caused by tumors or by the over-use necessary in certain trades.

B. FARQUHAR CURTIS.

<sup>1</sup>The paper of Czerny, read before the XV. Congress of German Surgeons, and its discussions, show that there is a growing inclination to follow Charcot's views, and to make a special class of the neuropathic joint diseases. This discussion took place after the work of Forgeard and Maubrac was published.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

**I. Bacteriology in Its Relations to Surgery.** By HENRY POWER, F.R.C.S. Fungi-looking at them essentially from a hygienic, and not from a botanical, standpoint, may be divided into four groups: (1) The fungi proper, (2) the mycetozoa, (3) the blastomycetes, and (4) the schizomycetes.

The most important to the surgeon is the last group, viz, schizomycetes, which have been thus classified by Klein. Micrococci, bacteria, bacilli and spirilla, and each of these he divides into those that are septic, those that are zymogenic, those that are chromogenic and those that are pathogenic.

Septic microbes are those which excite, or at least accompany, the putrefaction of organic matters; their action on proteids resembles digestion, the first products being peptones, then leucin, tyrosin, and the fatty acids, and finally iodol, phenol, scatol, hydrogen sulphide, ammonia, carbonic acid and water.

Zymogenic microbes are those which cause fermentation. The chief forms are (1) the alcoholic, (2) the lactic, (3) the viscous, (4) the acetic, (5) the ammoniacal, (6) the butyric, (7) the putrid fermentation. The chromogenic microbes develop coloring matter.

The pathogenic microbes are those which are capable of generating disease, and the evidence on which this disease-producing power rests, it must be admitted, is sufficiently satisfactory, for no microbe is considered to be the cause of a disease unless it is, in the first place, found to be constantly present in that disease, either in the blood or in the tissues; secondly, that when carefully isolated and cultivated it can, when introduced into the body of a healthy animal, give rise to the original disease, and be again found in quantity in the body.

True breeding. A considerable divergence of opinion still exists as to whether the various forms of microbes are really especially distinct from each other, and whether successive generations so far retain their characters that they may be held, supposing the conditions to be similar, to breed true. This is obviously an important point from a sanitary and hygienic point of view, for as Mittenzeig has well expressed it, if a form of microbe which has been proved to possess injurious qualities can be developed out of a harmless form, it is impossible that we should ever be able to establish sanitary measures that are of the least value, since we are always surrounded by millions of germs which may at any moment develop into a dangerous enemy. On the other hand, if these prove to be specific varieties, it is possible, that by gaining an accurate knowledge of its life history, its mode of origin, its favorite haunts, its mode of attack, the conditions of temperature and soil which are most favorable to its growth, its fruiting, the germination of its spores, and the like, we may learn to know our enemy and may adopt precautionary measures which shall have for their object the extermination of the species in question.

Micrococcus. Several forms are found in diseases associated with man. *Staphylococcus pyogenes*, found in pus, acute abscesses, empyema and osteomyelitis. Micrococci of pyæmia and septicæmia have been described. Pyæmic micrococci are round and measure  $\frac{1}{100000}$ th of an inch; septicæmia M., are oval and  $\frac{1}{25000}$ th inch. In 1879 Neisser demonstrated a microbe which is intimately connected with the whole group of purulent and contagious diseases of the mucous membranes. Bokai and Imkelstein produced gonorrhœa by introducing pure cultures of this micrococcus into the male urethra, which were rendered inert by the addition of small quantities of eucalyptus oil. Haab found that the cocci of purulent ophthalmia was identical with that of gonorrhœa. The streptococcus erysipelatosus was first noticed by Lukomsky, who found it at the margin of an erysipelatosus area where the disease was making active progress. The microbes in the centre of the area were dead. Fehleisen has continued the culture through seventeen or more generations on sterilised gelatine, and has still found that when inoculated into patients with a view of curing

lupus, cancer and sarcoma, a typical attack of erysipelas was produced.

It would appear that there are more kinds of micrococci than one found in cases of acute osteomyelitis, and probable *M. pyogenes aureus* co-operates with *M. pyogenes albus*, and some forms of bacilli.

Bacilli—A typical example is the bacillus of anthrax; no spores are formed by it in the animal body; it increases only by fission in that situation. This bacillus is interesting in three ways; first, because it was the first instance in which a microbe was shown to induce disease; secondly, because it can attack man as well as animals, though certain breeds appear to be exempt from its attacks; and lastly, because by inoculation its virulent effects can be greatly modified.

Bacillus of Syphilis—Lustgarten, by special staining, has demonstrated the presence of a microbe peculiar to syphilis. They resemble those of tubercle, are usually curved, sometimes in opposite directions, average  $4.5 \mu$  long. They are exceedingly rare and occur in groups of from two to eight situated in large oval or polygonal cells. Strümpell has endeavored to show that locomotor ataxia may be caused by the microbe of syphilis, starting with the assumption that sixty per cent. of ataxic patients have had syphilis. Professor Hügge states that he has obtained pure cultures of a tetanus microbe. Carle and Rattone produced symptoms resembling tetanus in rabbits and guinea-pigs by inoculating from wounds in tetanic patients. As the bacillus does not appear very abundant, it is difficult to understand how the simple growth of a fungus could produce such violent effects on the nervous system, and it seems more probably that, as the old supporters of the zymotic nature of tetanus thought, some kind of poison resembling strychnine is generated by the bacillus. We may suppose, then, that the bacilli, streaming forth from the wound as from a centre, distribute themselves through the body, and, further, that each bacillus lying in tissue represents a small but constantly acting source of poison, which first affects its own immediate vicinity, but as a consequence of absorption and its co-operation with others, affects ultimately the whole body, and we may thus explain the local tone and tension, its gradual extension, and finally the affection of the whole sys-

tem. It is interesting to consider how these organisms exert their baneful influence on the living bodies of the higher animals. There are four ways in which we may explain the action of microbes upon the infected animal (1) they may consume the store of pabulum of the cells: (2) by the discharge of excreta into the body of the animal on which they are living; (3) interfering with the due performance of the functions of the various depurating organs; (4) that their pernicious action is due, not to what they take or what they excrete, but to what they leave, and this is clearly allied to their imperious demand for oxygen. Thus chemical compounds named ptomaines are formed, and are believed to be the really poisonous agents. The difficulty that will strike everyone is, how is it, if the air is swarming with these ferocious microbes, that we do not all succumb to their attacks. The answer is, that healthy cells are able to withstand the attack of the microbes, and only when the cells are injured by mechanical or chemical means can the microbes prevail and gain admission, and finding a suitable soil multiply, and these by their mere numbers or by their effects, prove injurious or fatal to the whole body.—*Lancet*, Dec. 11, 1886.

H. H. TAYLOR (London).

**II. The Etiology of Tetanus.** By M. LARGER. The author brought some new facts before the Surgical Society of Paris to support his theory of the contagiousness of tetanus. They were taken partly from human pathology and partly from veterinary surgery. The first relate to a small epidemic of tetanus observed at the hospital at Colmar.

In January, 1882, a man died from tetanus following a wound of the hand. A few days afterwards a man suffering from a wound, also of the hand, was placed in the same bed; he developed tetanus and died. At the same time a child of seven was lying in the next bed. After the performance of amputation of the thigh, he also succumbed to tetanus. Last of all, in September, 1886, four years and a half afterwards, a man with a wound in the finger was placed in the bed occupied by the first tetanic patient. He contracted tetanus, but did not die.



The question of catching cold can only be raised in the second case. There was no tetanus in the town in 1882 or 1886, and the ward during that interval underwent no rigorous disinfection. In none of the cases could the origin of the tetanus be traced to any horse. The long interval separating the last from the preceding cases may suggest coincidence rather than relation of cause to effect.

M. Larger notes that contagion with a long interval crops up three times among the facts he has gathered. Ten years had elapsed between two cases of tetanus occurring amongst the horses of one stable at Achères; two years between the time the last horse was affected with it and the time a woman contracted it after being injured before the stable in question; lastly, eleven years between the cases of two workmen at Barentin who occupied the same room.

In the domain of veterinary surgery mention should be made of M. Cagnat of St. Denis, who after twenty-five years of practice as a veterinary surgeon and never seeing a case of tetanus, meets with six cases in six months, occurring in six horses who had been operated upon with the same *ecraseur*, none occurring amongst the animals operated upon with other instruments. This *ecraseur* became harmless after it had been dipped in boiling oil.—*Revue de Chirurgie*. January, 1887, p. 69.

#### NERVOUS AND VASCULAR SYSTEMS.

**I. Case of Stretching Combined with Resection of the Spinal Accessory in the Treatment of Spasmodic Torticollis.** By M. SCHWARTZ (Paris). A woman, *æt.* 26, was affected with violent contractions of the muscles of the neck, which began by being intermittent and afterwards became permanent. The head was bent over to the left side. M. Schwartz stretched the nerve, using a force equal to two kilogs, then resected a piece two centimetres long. The patient was relieved, but not cured.

M. Tillaux, who read the report to the Surgical Society, says he has made experiments on dead bodies in the stretching of the spinal accessory nerve with a view to seeing whether during this operation any

disturbance took place in the bulb of the nerve. He believed this disturbance of the bulb to be a reality although in life stretching the nerve gave rise to no trouble of a bulbous origin. So he hesitates about doing this operation, and in M. Schwartz' case would only have performed the resection.—*Progrès Medical*, Nov. 20, 1886.

L. MARK (London).

**II. The State of the Femoral Artery after Ligature for Popliteal Aneurism.** By MR. SAVORY (London). The paper consisted of an analysis of twenty-six cases in the museums of the London hospitals in which the femoral artery had been tied in Scarpa's triangle for the cure of popliteal aneurism. Of these specimens seventeen were complete. Of these seventeen cases, the artery was pervious throughout in thirteen, and partially closed in four. In none was the artery pervious throughout. Of the seventeen specimens thirteen were cured. In these the artery was pervious in over eleven, and partially closed in four. In two the operation had failed to cure, and the artery remained pervious in both. Mr. Savory gave details of cases in his own practice. In one case a man aged 37, a hawker, with popliteal aneurism, the pulsation in which could be controlled by pressure on the femoral, there was a three months' history. In February the artery was tied in Scarpa's triangle. A slight return of pulsation took place on the third day. One year after the aneurism had returned with slight pulsation, and a bigger tumour. It was treated with rest and elastic bandages without much effect, for six months later it was in the same condition. The patient was then anæsthetized, and the leg bandaged with Esmarch's bandage; the popliteal artery was then tied in its first portion. This operation was perfectly successful. In another case the femoral artery was first ligatured in Scarpa's triangle, next in Hunter's canal, and finally a third time in the upper part of the popliteal space. The question of ligaturing the popliteal artery for popliteal aneurism ought to be reconsidered. Mr. Savory was disposed to think that this method would prove most useful, and he said he should generally prefer to adopt it in the future. Mr. John Wood said that the practice would be practically a return to Anel's method,

but then Anel had not the advantage of the present antiseptic methods of treatment by which inflammation was prevented. Mr. T. Smith had tied the popliteal artery for popliteal aneurism several times with success and should recommend the operation.—*Lancet*, December 18, 1886.

H. H. TAYLOR (London).

**III. Diffused Traumatic Aneurism of the Anterior Tibial Artery of Ten Weeks' Duration; Attempted Ligature; Amputation.** By Mr. PAGE (New Castle-on-Tyne Infirmary, from notes by F. P. Maynard). The patient, æt. 16, was admitted with the following history. About nine weeks ago he was stabbed with a pen-knife (blade two inches long) in the left leg, at the junction of the middle with the lower third, about half an inch outside the crest of the tibia, in a direction backwards and inwards. It bled freely, spouting out dark blood. The leg swelled. Under rest and treatment with poultices the wound healed; the swelling, however, remaining. The day after his return home great pain came on, and the swelling again increased. It was poulticed, and 14 days afterwards was opened and exit given to much blood clot and a few drops of fetid blood. The bleeding was stopped by pressure. The hæmorrhage continued, at intervals, in spite of treatment until the day before admission—when free bleeding occurred. On admission the boy was very anæmic and emaciated, poor pulse, and bad appetite. The lower and half of the middle third of the leg were occupied by a swelling about eight inches in length, uniformly fluctuative and soft; and situated about its middle was a small wound, from which blood was oozing a drop at a time. This swelling communicated distinctly with a similar but smaller one behind the inner side of the tibia. Both were without pulsation. Pulsation was absent in the anterior tibial artery below, but present in the posterior tibial. The foot was cedematous. Pressure was applied and the oozing stopped. Hæmorrhage again occurring three days afterwards, the swelling was laid open—a pound of blood clot evacuated—a tourniquet being on the femoral. The anterior tibial artery could not be found; two or three bleeding venous points were tied,

and one small artery. Then the hæmorrhage ceased. Some hours afterwards, however, the bleeding again recurred, and the leg was amputated through the middle third by lateral flaps. Before, however, convalescence became established, it was necessary, on account of bleeding, to open up the stump and tie a small vessel. The end of the tibia having been found to be necrosed at the same time, a piece of it was sawn off.

The patient ultimately was sent to a convalescent home—having gained flesh rapidly after the last operation.—*Lancet*, March 12, 1887.

H. PERCY DUNN (London).

**IV. Large Visible Pulsating Artery on the Posterior Wall of the Pharynx.** By J. W. FARLOW, M. D. (Boston, Mass.). This is a report of five cases with remarks upon the importance of recognizing the condition in operations upon the region. (1). Two large pulsating vessels upon the back of the pharynx, about a quarter of an inch inside the posterior pillar of the fauces and lying directly beneath the mucous membrane; the vessels were nearly vertical and the left one had a more marked pulsation than the right; to the finger the impression was given of an artery as large as the radial. (2). A large pulsating vessel on the posterior wall of the pharynx on the left side. (3). An almost exact counterpart of the first case. (4). A large vessel on the back of the pharynx about half way between the uvula and the posterior pillar of the fauces on the right side; this case is reported from memory simply. (5). A large pulsating vessel on the right side of the posterior wall of the pharynx.—*Jour. Am. Med. Ass'n.*, April 2, 1887.

**V. Cirroid Aneurism Treated by Simultaneous Ligature of both External Carotids.** By THOMAS M. MARKOE, M. D. (New York). A man, æt. 20, had received, five years previously, a blow with a club on the left side of the head near the parietal eminence. A small lump had remained after the injury, and had slowly increased in size until in the course of two years, it had become a pulsating tumor. At the time of the operation he presented a large, soft, fluctuating tumor situated over the left parietal bone, toward which several large and

tortuous branches of the temporal artery converged and into which they manifestly opened; the same condition existed, though to a less degree, on the right side; the occipitals seemed to be but slightly involved. The pulsation was very marked in all parts of this mass of enlarged vessels, notably so in the central enlargement. A thrill was felt on placing the finger upon the vessels, and also a feeble bruit: the entire series of vessels was easily compressible. The patient had no pain, only a sense of discomfort about the head, and, when he stooped or made a violent effort or indulged in drinking, he felt a distressing sense of distention. The patient was very anxious to obtain relief, as the tumor had grown so rapidly as to cover the entire left side of the scalp, and the vessels were beginning to dilate on the opposite side. Both of the external carotids were then ligatured—below the lingual arteries so as to control the circulation through the occipitals—a procedure advocated by Bruns, because it seemed that the circulation through the scalp could thus be most effectually controlled. It was found at the time of operation that the central mass consisted of a large ampulla, with which several dilated arteries communicated. The pulsation ceased after the operation, and the dilated vessels gradually disappeared, but the ampulla still remained, although it no longer pulsed. While the cure in this case was not perfect, the operation performed seemed to give the best results. Extirpation of the tumor was another alternative, but it was limited to cases in which the mass was circumscribed and, while sometimes successful, was often fatal.—*V. Y. Surgical Society*, February 9, 1887.

**VI. Ligature of the Popliteal Artery in Elephantiasis of the Leg.** By EMANUEL DAGNINO, M. D. (Caraccas, Venezuela). Three cases are reported with a favorable result in each. (1). In a middle-aged man with his left leg and foot enormously enlarged by elephantiasis, the popliteal artery of that side was ligatured with considerable difficulty, owing to the alteration of the tissues of the limb by the disease; the wound healed in about fifteen days and from that time a marked amelioration of the elephantiasis was observed, which continued until his discharge two months later. (2). In a man. æt.

42, with elephantiasis of both legs, the left popliteal artery was ligatured with results so satisfactory that the patient urged similar treatment of the other limb. (3). This was done, and in due time the patient left the hospital nearly in perfect health, after an intercurrent attack of yellow fever. From these cases the author is inclined to advise ligature before amputation, which usually produces but temporary relief, the disease soon reappearing in another region.—*Therapeutic Gazette*, Feb., 1887.

JAMES E. PILCHER (U. S. Army).

## HEAD AND NECK.

**I. Penetrating Wound of the Head; Loss of Brain Substance; Right Hemiplegia; Aphasia; Recovery.** DR. CHAMBARDE-HÉNON (Lyons). A boy, æt. 9, losing his hold while sliding down the banisters, fell from the height of a second floor into the well of the staircase. He came down head foremost onto the edge of one of the bottom steps, so that his skull was shattered and fragments of brain were thrown to a distance of one metre. These fragments collected together formed a mass about the size of a blackbird's egg. The patient was seen a few minutes afterwards. Over the middle of the left parietal bone there was a wound penetrating into the brain, 4 centimeters long, from which there was escaping blood, cephalo-rachidean fluid and cerebral pulp. A small fragment of bone lying loose in the wound was withdrawn at once. The edges of the wound were cleansed with a sponge. Although the patient was in a comatose state the pulse and respirations were fairly good and the lips had a good colour. No other injuries were found about the body. The right ear was severely cut; the right eye was hidden under a mass of ecchymosis. There was a large fluctuating effusion of blood reaching from the middle of the forehead to the wound in the left parietal region. Through this tumour the fracture could be felt extending from the border of the right orbit to the penetrating wound on the left side. The child's head was covered with a bladder full of ice, and a little later on under this was placed an antiseptic dressing.

After a few hours the movements of the left side of the body had



returned, but the right half of the body was completely paralyzed. In the evening the child was able to take some milk. Next day he was in the same state, but the left eye showed that he was awake. No convulsions; no sickness; pulse 120.

During three weeks the child went on steadily improving, and the wound healed up. In twenty-six days the paralysis had disappeared in the lower extremity and diminished in the upper. The patient then began sitting up, talked correctly, sang, but still forgot a few words and names. The wound was almost cicatrized; pulsation and fluctuation remained in it. In forty days there was no paralysis left.

Twenty-seven months after the accident all there was to observe about the patient was, that the right foot pointed rather inwards, that the right arm was weaker than the left, and that the right eye was not so widely open as the left. The tongue was put out straight. There had been no convulsions.

The part injured appears to have been the ascending cerebral convolutions situated in front and in the middle of the fissure of Rolando, and the ascending parietal convolutions in front and behind the same fissure.—*Le Lyon Médical*, Nov. 7, 1886.

L. MARK (London).

**II. Case of Post-Pharyngeal Abscess.** Mr. WAINEWRIGHT (London). G. H. was admitted into the West London Hospital on May 10, 1886, suffering from attacks of dyspnoea. His voice was low and harsh, his face very anxious, and the breathing distressed, with frequent attacks of dyspnoea. On examination of the neck a large fluctuative swelling was found beneath the trapezius on the right side, and on looking into the mouth the pharynx was found bulged out on that side and pushed toward the left. There was much swelling in the right submaxillary region. The following history was elicited: The swelling with pain began six weeks previously, and there had been gradually increasing dysphagia, so that for the last seven days he had only been able to swallow fluids. He had contracted syphilis five years previously, and some months ago a general eruption of rupial character broke out, from which he was still suffering. An incision

was made into the abscess under the trapezius, with antiseptic precautions, and about 2½ ounces of pus let out. This relieved the breathing, and it was hoped that the other abscess would empty itself through this.

On May 4, (sic) at 1:30 A. M., he had become much worse; the breathing entirely stopped for a few moments, and artificial respiration was requisite in order to bring him round. Examination with the laryngoscope revealed a large amount of œdema of the right side of the pharynx and tongue, and a swelling on the same side involving the whole of the right side of the pharynx, and projecting beyond the middle line. This was incised and about 2 ounces of fœtid pus escaped. The symptoms were at once relieved, and when the patient spoke it was with a voice which was now full and clear. A mixture of iodide of potassium was subsequently ordered and convalescence followed, the abscesses having healed soundly by the 27th.—*Lancet*, Oct. 9, 1886.

H. PERCY DUNN (London).

## CHEST AND ABDOMEN.

### I. The Treatment of Tubercular Peritonitis by Incision.

This method of treatment has been gradually developed from observation of the improvement in such cases following exploratory incision. The more recent writers only claim for it the rank of palliative treatment. Such relative cures from opening the abdomen and removing the transudation have been reported by Spencer Wells (one case operated in 1862), Dohrn (1), Naumann (2 in 4 cases) Hegar (2), Lindfors (1), Deal na-Schröder (1), König (4), Homans (1), and Poten-Hartwig<sup>a</sup> (1). Two further cases are given by F. Schraz,<sup>b</sup> and one operated on the same plan by Hofmohl.<sup>c</sup> One of Schwarz's cases was operated at Billroth's clinic in 1884 and is still well. In the other, from Breisky's clinic, a previous puncture had given but very temporary relief. Here incision with toilet of the abdominal cavity has been followed by great general improvement without further local manifestations for the few weeks that have elapsed.

Wien. Med. Wochr., 1887, Nos. 11,<sup>a</sup> 13, 14, 15,<sup>b</sup> and 16.<sup>c</sup>

In these seventeen cases there has been no recurrence of the transudation. In Hofmokl's case, however, some fluid collected again—a trial puncture preceded the laparotomy—yet the patient lived six months in comparative comfort.

All these cases were in women. In most of them the incision was made for diagnostic or other purposes. Doubtless the results thus gained are too favorable for an average, as successes of this kind would be much oftener published than failures. The patients' ages ranged from 4 to 57 years, mostly from 17 to 33 years. One patient (Well's) lived 10 years; others were alive and, from relapse four, two, one and a half down to one-fourth years after the operation. These results are denominated "relative cures."

The best results have been obtained by complete removal of the exudation and exact suture of the wound. The few treated by drainage were long bothered by secreting fistulæ. No difference is noted from the various ways of disinfecting.

In several of the cases the true nature of the trouble was confirmed by the microscope (bacilli, etc.). As yet there seems to be considerable difficulty in making a positive diagnosis before any operative interference.

Schwarz puts forth the following indications, where the diagnosis of peritoneal tuberculosis is certain, palliative incision is preferable to the customary puncture.

The transudation is to be removed as fully as compatible with gentle means, best by dry methods. This is to be followed by disinfecting toilet of the peritoneum and exact closure of the opening.

From analogy with surgical treatment of the various forms of tuberculosis, youthful age is no contraindication. Pulmonary affections, when not too far advanced, are rather indications for the operation than otherwise, since the diaphragm and hence respiration is thus relieved, and from experience such patients are then found to improve. Where the diagnosis is uncertain, exploratory incision is indicated.

**II. On the Behavior of the Gut After Separation from Its Mesentery.** By Dr. D. G. ZESAS. Since Madelung's refer-

ence to this matter at the German Surgical Congress in 1881 it has been the subject of considerable clinical and experimental study (vide e. g., *ANNALS*, 1885, July, p. 79) and withal of some dispute. Zesas treats of only the experimental side of the question. From experiments on rabbits Madelung asserted that on severing 10 to 15 ctm. of mesentery from large or small intestine without direct injury to the gut, gangrene of the whole piece of intestine whose vessels had been severed regularly followed. Rydygier in his first experiments on dogs found that the mesentery could be divided for some 3 ctm. without gut necrosis. He next separated a length of 4 to 5 ctm. in rabbits with fatal results like those of Madelung. A rabbit survived double ligation and division of a mesenteric artery pretty well away from the intestine. He next found that if in dogs a length of 9 to 15 ctm. be separated close to the intestine the latter necrosed. R.'s conclusions were: 1. The various classes of animals, probably from a differing vascular supply, are not equally tolerant of division of the mesentery. 2. The longer the separated part the greater the danger from gangrene. 3. The nearer the gut the more readily does gangrene develop.

Tansini investigated the different parts of the intestinal tract, and seemed to show that the large intestine was thus more vulnerable than the small.

Zesas gives fifteen own experiments on dogs and rabbits. He does not find so much difference in the various classes of animals, but that separation of the mesentery close to the gut always results in necrosis irrespective of animal species or part of the intestine involved. When the separation is far away from the gut no gangrene followed. The mesenteric arteries are not strictly terminal vessels. In the cadaver he divided the mesentery at various points and at varying distances from the gut. On injecting colored fluid into the abdominal aorta, it was seen that owing to the free anastomoses this reached the gut-wall at all points except where the mesentery had been separated close up to the intestine.

Conclusions: 1. In the undivided gut where the mesentery is separated close up to it, the corresponding part must be resected to avoid consequent gangrene. 2. Where the separation is 2 to 3 ctm. or

more away from the intestine it does not necessitate resection. 3. The longer the separated strip of mesentery the greater is the danger of gangrene. 4. Where the gut is severed, the mesentery must not be separated beyond the line of section, if gangrene at the point of section is to be avoided. 5. Division of the mesentery, when not adjacent to the gut, is equally well borne by both large and small intestine.—*Arch. f. klin. Chirg.* 1886. Bd. 33, Hft. ii.

**III. Case of Pylorus Resection.** By Dr. H. SCHRAMM (Lemberg). Woman. æt. 58 years. Stomach trouble for a year and a half. A fist-sized, hard, sensitive tumor, movable in all directions, was found at the level of the umbilicus. No ectasis of stomach.

Provisional to operating warm baths, laxatives, and for two days only fluid diet were given. Stomach thoroughly washed out with salicylic acid the evening before. Laparotomy. Cancer of pylorus, implicating the stomach more than the duodenum—together about 8 ctm. Stomach and transverse colon firmly glued together; blunt separation of adhesions. After isolation of the affected part a four-cornered iodoform gauze compress was pushed under stomach and duodenum. Two corners were pulled up surrounding stomach and two around duodenum, thus closing the abdomen and preventing any soiling. A Wehr's compress was applied to both viscera and the parts step by step divided and tied together. The narrowing and uniting sutures consisted of four layers, for mucosa and muscular layer, then superficial and farther reaching Lembert's sutures in the serosa. Removal of compress. Iodoform to the suture line. Length of operation three hours. The carcinoma had ulcerated internally. No stenosis of pylorus. Uninterrupted recovery. Primary union. Left bed in twenty-five days. Two months po. o. her health was again good with no sign of relapse.—*Centbl. f. Chirg.* 1887. No. 12.

WM. BROWNING (Brooklyn).

#### TUMORS, ABSCESES.

**I. A Postscript to the Cases of Echinococcus.** By Dr. A. E. FICK (Cape Colony). Since the publication of the nine cases of echinococcus observed by the author (in Vol. 24 of *Deutsch. Zeitschr.*

*f. Chir.*)<sup>1</sup> two further cases there alluded to presented themselves to the author for operation. The child, whose case was described as No. 6, was operated upon February 11, 1886, the tumor of the liver as well as the area of dulness in the apex of right lung having increased in size. Incision of abdomen; cyst stitched to wound; incision of cyst and removal of contents.

A second cyst was found protruding into the first, and was also emptied. Antiseptic dry dressings. Temperature after operation 40° 0'. Pulse 150. Next day 40.5°. Pulse 160. On sixth day dressings saturated with gall. It was found that a bile-fistula vented all the bile into the first cyst, causing great emaciation and digestive disturbance. Numerous attempts were made to close the fistula, but failed. Finally, the granulating cyst contracted, and after six weeks the child's health began to improve.

The echinococcus in the lung having now become greatly enlarged and causing fever as high as 39.4° C. and vomiting and coughing, was now operated upon, April 30, 1886. Resection of second rib. The cyst was now pierced with an exploring needle, when suddenly collapse set in, and alarming symptoms continued for three hours, during which artificial respiration had to be maintained. The cyst communicated with the bronchi, as was proved by irrigation. Finally, sepsis having set in, resection of the third rib was performed, the sac more thoroughly cleansed, and improvement ensued. Twice echinococcus-membranes were expectorated and caused suffocatory symptoms; but their origin could not be satisfactorily explained.

Another case, described as No. 9, operated upon without result, was again seen on April 7. After several futile attempts the cyst was reached (April 20) situated anteriorly to the spinal column, and was successfully emptied. A flow of bile continued for 10 days from the incision. A slight peritonitis and an attack of pleurisy, owing to the operative explorations, had disappeared after six weeks, and the patient was doing well at the time of reporting.

The author publishes these two observations in confirmation of the

<sup>1</sup>Vide ANNALS OF SURGERY, Vol. 5, p. 285.



conclusions previously arrived at.—*Deutsch. Zeitschr. f. Chir.*, Bd. 25, Hft. 1 and 2, December 8, 1886.

W. W. VAN ARSDALE (New York)

**II. Sarcomatous Floating Tumor of the Knee-Joint.** By R. F. WEIR, M. D. (New York). In addition to the two cases which he had already reported (*ANNALS OF SURGERY*, Vol. iv, p. 359) the speaker had about six weeks previously removed a sarcomatous pedunculated tumor from the left knee-joint of an Italian, æt. 42, the joint having been disabled for several months; beginning as an ordinary synovitis, sundry painful catchings of the knee-joint with aggravation each time of the difficulty of walking soon followed. On the inner aspect of the knee could be felt a movable and rather hard body of the size of the end of the forefinger. On incision under carbolic spray down to the mass previously fixed with a tenaculum, it was found to be, instead of cartilage, a reddish yellow tumor about an inch long, attached by a slender pedicle, which was tied with catgut and severed and the growth removed. The wound was not sutured, but dressed antiseptically, and the limb secured in a posterior splint; no reaction followed, and at the end of ten days the dressings were removed and the patient allowed to move his limb cautiously about the bed, and a week later to walk. A month after the operation, when about to be discharged from the hospital, he committed suicide, which permitted microscopical examination of the tissues comprising the joint, which showing that the sarcomatous growth had not affected any of them, which confirmed Dr. Weir's theory that in these cases it is sufficient to remove the offending mass; his first case, operated upon in 1884, which is still free from recurrence, further confirms this view.—*New York Surgical Society*, December 8, 1886.

**III. The Cure of Cancer by Operation.** By GEORGE F. SHRADY, M. D. (New York). The author epitomizes his paper under six heads, as follows: 1. Cancer is essentially a local disease, and can be cured by operation in spite of recurrence. 2. Operation, when it does not cure, prolongs life and diminishes the total amount of suf-

fering. 3. Operations should be repeated as often as there is any chance of entirely removing recurrent growths. 4. The earlier and the more thoroughly the operation is performed, the better. 5. The disease, when it recurs, is generally of a milder type than that of the original growth, less painful and less exhausting. 6. Antiseptic surgery makes more radical operations possible, with better ultimate results than formerly obtained.—*N. Y. Med. Rec.*, January 22, 1887.

#### IV. Personal Experience in the Treatment of Cancer.

By J. COLLINS WARREN, M. D. (Boston, Mass.). The author has observed no geographical distribution of cancer nor has he much faith in the heredity of the disease. He quotes, however, two striking instances of cancer consequent upon local irritation: (1). A most malignant cancer of the breast arising in a healthy and finely developed woman after a severe blow at the point with a baseball. (2). A chronic balanitis with thickening of the prepuce, due to an attempt on the part of the patient to cure a phimosis with a razor, followed by an epithelial ulcer in the sulcus below the corona.

*Cancer of the Face.*—Referring to the English fashion of dividing cancer of this region into two varieties, cancer of the lip and rodent ulcer, and the great variety of growths included in the latter category, he remarks that as a rule, they occupy the region of the face situated above the line of the mouth, although he had observed them upon the chin and even on the neck behind the ear. He notes the crateriform ulcer of Hutchinson and quotes a typical case recently observed. The variety usually developed from the epithelial layers of the skin and frequently accompanied by keratosis senilis is apt to be multiple, as in a case related. Excision with the knife best avoids deformity except when the disease is situated in some angle of the face, as in the neighborhood of the nose, when caustics produce a better result. When larger wounds are necessary, the cautery, leaving an open wound protected by an eschar, is of advantage; the curette should always be used with the cautery, but never alone. He refers to the advantage of cocaine in some of these cases and notes the variation exhibited with regard to recurrence by different persons.

*Cancer of the Breast.*—He favors the radical operation with removal of the axillary glands, and quotes a number of cases so treated with an immunity of from eighteen months to three years.

*Cancer of the Rectum*, comparing his experience with the statistics of foreign writers, is not so frequent in this country as in England and Europe. He is inclined to advise as little interference with the disease locally as possible, unless it be seen at a very early stage, which has never occurred to him.

*Cancer of the Œsophagus* has been very unsatisfactory in his hands when treated locally by dilatation of the stricture, and in a case not yet complete, he has tried gastrostomy.

Treatment with drugs, including Chian turpentine, has given negative results in his hands.—*Boston Med. and Surg. Jour.*, February 17. 1887.

## V The Question of Operation in Perityphlitic Abscess.

By R. F. WEIR, M.D. (New York). In case of a man æt. 22 years, with a history of abdominal pain and evacuation of sero-purulent fluid by a needle inserted to the depth of an inch and a half in the right iliac fossa, but with no marked dulness or swelling, an incision along an aspirator needle evacuated pus and, although at first the abscess cavity seemed to be limited by adherent coils of intestine, the general cavity of the peritoneum was found to be involved in a suppurative peritonitis. Median laparotomy revealed a perforating ulcer at the root of the vermiform appendix on its free surface posteriorly throughout the entire length; the entire appendix was tied off with catgut, the abdominal cavity douched with warm water and a duplication of iodoform gauze inserted into the midst of the intestines in the iliac fossa and in the pelvis—Miculicz's method; drainage was provided and the incisions closed. The patient rallied well from the operation, but died on the next afternoon. There were two points of especial interest connected with the case. One was the difficulty of determining without exploratory iliac incision, and sometimes even after this was done, whether or not the typhlitic abscess was yet a local affair; peritoneal symptoms were not infrequently seen with

perityphlitic inflammations, especially with that variety that resulted in limited peritoneal abscess. The absence of tumor and the profuseness of thin sero-pus led to a renewed and thorough examination, which had hitherto been refrained from, lest limiting protective adhesions should be broken down. The second point was the treatment of the perforated appendix. Should the sloughy opening be trimmed off and inverted and closed as in an intestinal perforation, and the appendix preserved or should it be boldly removed as in this case? The closeness of the perforation to the cæcum interfered with his desire to cut away the sloughy edge left even after the excision of the appendix, but, where practicable, he thought this should be done before the Lembert sutures were applied. He, however, knew that simple ligature had frequently sufficed where the appendix had been removed in this and other difficulties, and he favored the usual extirpation of the appendix as not adding to the risk and preventing future trouble.

There were cases in which the boundary wall of a perityphlitic abscess was formed by coils of small intestine glued together, and he could recall three instances which had occurred tolerably recently in which, after the abscess had been opened, he could feel with his finger the inner wall of the abscess thus formed. The extensive researches of Treves utterly disproved the old idea of the cæcum and appendix being continuous posteriorly or otherwise with the subperitoneal areolar space; in fact in a hundred dissections made by this English observer, he had never yet seen the posterior surface of the cæcum uncovered by peritoneum nor had he encountered a meso-colon. In reality in the great majority of cases, the entire beginning of the large intestine was completely surrounded by peritoneum up and onto the ascending colon. Moreover the mesentery of the appendix was derived from the ileum in every instance. Hence perforating appendicitis and the still more rare cœcitis must primarily produce a peritoneal suppuration, limited or diffused, or else by the lucky occurrence of adhesions before the accomplishment of the perforation, give rise thus to a subperitoneal abscess, the so-called para-typhlitis. Both varieties undoubtedly exist, but if it be admitted that the first form occurs, it is right that the matter should be evacuated as soon as its presence is

recognized. This could be obtained early by the use of an aspirating needle, or the question of time would generally decide surgical interference. This, in a consideration of over two hundred and fifty cases, had been placed by Fitz at not later than the third day, and he should certainly agree with this dictum in those cases where the symptoms were marked and existed with persistent temperature elevation. He believed that many of the cases that recovered, either evacuated themselves by the bowel or bladder or underwent absorption, which was not often, or were, what was more likely, cœcitis from fæcal impaction, and not of a suppurative character, and there he had seen and learned to expect a ready subsidence of temperature heat after the administration of anodynes. Fitz and Bartholow firmly held the view of the intraperitoneal origin and seat of these abscesses. Individually he had never yet regretted operating too early in cases of right iliac inflammatory tumors. His impression of the site of such abscesses had been formed for many years, he having been led to the investigation by once witnessing the occurrence of a rupture of a perityphlitic abscess into the general peritoneal cavity under very slight palpation of the tumor, with a rapidly fatal issue without surgical interference, as the accident took place before the general use of laparotomy. He concluded by reiterating the fact that if a laparotomy was necessitated for an advanced general suppurative peritonitis or even in the rarer cases of acute perforation of the appendix, by lifting out the intestine filling the right iliac fossa, the entire field of exploration was fully brought into view, and that lesions difficult to detect at a post-mortem examination could be recognized in the living subject quite readily by changes in color and consistence which were lost in cadaveric alterations.

H. B. SANDS, M.D. (New York) had operated for perityphlitis a great many times, but had never yet found a circumscribed abscess bounded simply by coils of adherent intestine; he was aware that such was a common view, but he believed it to be inaccurate. He had also observed that when perforation of the appendix occurred into the serous cavity, the result was always fatal. A short time ago a case came under his observation in which the symptoms of circumscribed

tumor were wanting, but in which there were present marked pain and tenderness in the cæcal region. In that case, upon incision through the abdominal wall over the seat of tenderness, a small amount of pus had escaped, and, on putting the finger into the opening, the feeling of intestine was imparted; death without autopsy ensued a few hours after. He would not dispute the accuracy of Treves' observations, but he deprecated early operations, (1) because they might be unnecessary and (2) because they might be unsafe. He had seen a large number of cases in which the inflammatory swelling had subsided without any surgical operation and the patients got well. The danger of spontaneous opening of the abscess into the peritoneum at an early period he believed to be exaggerated and unsupported by clinical facts; he could recall but a single instance in which such a rupture had occurred as early as the seventh day of the disease. Concerning the second point—the risk attending early operations—he believed it to depend on the liability of the entrance of the fœtid contents of the abscess into the peritoneal sac. In contending that circumscribed perityphlitic abscesses were usually external to the peritoneum, he did not mean to deny the anatomical relations of the cæcum, which he thought were generally understood; but he failed to see why the almost complete investment of the cæcum by the peritoneum or the presence of a mesentery attached to the appendix vermiformis should determine the entrance of fæcal matter, escaping from a perforated appendix, into the peritoneal cavity. His supposition was, that in cases of circumscribed abscess due to such perforation, this was preceded by adhesion of the serous membrane covering the appendix to that lining the iliac fossa, and that thereby the latter was lifted by the pus and fæcal matter, and the invasion of the peritoneal sac prevented. But adhesions would not usually be limited to the perforated appendix; they would often involve the peritoneum covering the cæcum, the abscess, and the back of the anterior abdominal wall; such adhesions, however, would be absent at an early period, and hence one danger connected with early incision. He remembered several cases in which the presence of pus had been demonstrated by the use of the aspirating needle, and in which an incision made carefully along the latter held *in situ*, opened the peritoneal sac, adhesions not yet having taken



place. After closing the opening made in the serous sac, adhesions ultimately occurred and the abscess evacuated its contents externally with safety and without further surgical operation. It was fair to presume that the simultaneous opening of the peritoneal sac and the abscess cavity might be followed by a fatal result. He would not dispute the desirability of an early evacuation of the contents of a perityphlitic abscess, but he thought that the danger attending such an operation should be duly weighed. Very few cases would be injured by being allowed to remain for a week or ten days according to the local symptoms; to operate always within two or three days from the onset of the disease would be much like performing laparotomy for every case of pain in the abdomen. Another reason for delay was that, even when the peritoneum covering the abscess did not become adherent to that lining the back of the anterior abdominal wall, the line of reflection might be pushed upward by the growing swelling so as to be above that generally selected for incision. Being asked if, given a case where there was no appreciable tumor, symptoms should lead to the use of the needle and pus be detected, there would be greater danger of opening the peritoneum at that time than in operating for ligature of the external iliac artery, the incision being close to Poupart's ligament, he replied that he thought it would be possible, but it might be more difficult in consequence of morbid alterations due to inflammation.

C. K. BRIDDON, M.D. (New York) had operated in a case where there was a swelling, the most prominent portion of which appeared to be three inches above Poupart's ligament, with a zone of less resistance immediately above the ligament. An aspirating needle introduced one inch above it gave exit to pus; it was left in position and the usual incision made. When the transversalis fascia was reached, it was found that the peritoneum had not been pushed up by the abscess and that the needle had consequently passed through two layers of it. It was then displaced upward by the fingers until the cavity of the abscess was opened without further implication of the peritoneum than that caused by the needle; the patient made a prompt recovery. He regretted operating early in a case where the swelling was situated deep

in the iliac fossa and aspiration gave exit to pus. The needle was left *in situ* and, after division of the muscular and aponeurotic coverings by the scalpel, further separation was made by the fingers until a cavity was reached at a very considerable depth from the surface; it contained only a small amount of pus; it was drained and dressed in the usual manner and did well for forty-eight hours, when an acute and rapidly fatal peritonitis was developed. He had made autopsies in three cases where death had occurred in from twenty-four to thirty-six hours from perforation of the appendix; there were no limiting adhesions, but general diffuse peritonitis—no formation of abscesses at all, as he did not think there had been time.—*V. Y. Surgical Society*, Dec. 8. 1886.

## BONES, JOINTS, ORTHOPÆDIC.

## I. Osteoplastic Operation after Necrosis of the Femur.

By FREDERICK LANGE, M.D., (New York). A German man, æt. 46 years, had when ten years old what was doubtless a severe acute osteomyelitis with spontaneous fracture of the thigh, which resulted in an angular bend at a point between the middle and lower third of the right femur, with eight inches of shortening and bony ankylosis of the knee-joint at an angle of about  $140^{\circ}$ . A number of sinuses had opened, and suppuration had persisted for about eleven years, when it ceased and so remained for nine years, when sinuses formed again and did not heal. There had been no discharge of bone nor had any surgical operation been performed until thirty-five years after the original attack. Dr. Lange performed necrotomy by making an H-shaped incision, forming flaps which included the periosteum, and removing the patella and the anterior portion of the lower third of the bone, so that after the removal of numerous sequestra, a shallow bone cavity was formed, into which the soft parts were depressed and fixed by strong straight needles. There could have been no necrosis from the first attack or the suppuration would not have ceased for nine years, and the pieces of dead bone found at the operation belong to a process of secondary necrosis; indeed they present a character quite different from that of the usual sequestrum, resembling dead cancellous tissue, and

were found in a portion of the bone which normally has no bony substance in its centre. The whole lower third of the thigh bone proved to be filled with a new formation of bone and that had undergone partial necrosis, apparently in a very chronic manner. The primary acute osteitic process had not the immediate effect of necrosis, although it must have been very severe, judging from the spontaneous fracture of the bone, but it led to diffuse ossifying osteitis. Probably some of the infected material remained encysted until later on, in consequence of some noxious influence, it must have been set free and by its injurious action caused necrosis of the newly formed central osteophytic substance. About three months after the operation, a fistula formed again, and about four months ago it became necessary to make a thorough revision and scrape out and chisel away some carious bone at the bottom of the former cavity; at the present time everything seems perfectly solid and cicatrized. The speaker strongly emphasized the value of this plan of obliterating bone cavities left after necrotomy by a plastic inversion of the soft parts, and dwelt somewhat upon the operative details. He concluded with some remarks on secondary metastatic necrosis.—*N. Y. Surg. Soc.* Jan. 26, 1887.

**II. A Case of Fracture of the Anatomical Neck of the Scapula.** By H. B. HEMENWAY, M.D., (Kalamazoo, Mich.). This case occurred in a physician, æt. 51 years, who fell striking his left arm just below the shoulder heavily upon the edge of a raised sidewalk. On account of his thick clothing no bruise appeared. The condition was first diagnosed as simple subglenoid dislocation of the head of the humerus. Reduction by manipulation failed but forcible lateral extension with the foot in the axilla caused the deformity to disappear after which pressure just below the end of the coracoid process produced crepitus. The diagnosis was then changed to fracture of the anatomical neck of the scapula. The case is discussed in detail and all varieties of dislocations and fractures of the surgical neck of the scapula and of the anatomical or surgical neck of the humerus logically excluded. While the author's analysis of the symptoms seem to point very logically to fracture of the anatomical neck of

the scapula, in view of the fact that such a lesion has never before been authoritatively reported, and that the confirmation of dissection, without which a positive diagnosis is hardly possible, was absent, the case can hardly be regarded as an undoubted fracture of the anatomical neck of the scapula.—*Jour. Am. Med. Assn.* Feb. 5, 1887.

JAMES. E. PILCHER (U. S. Army).

**III. On the Treatment of Old Transverse Fracture of the Patella.** By Prof. E. VON BERGMANN (Berlin). The statistical reports of some operators, giving their results in the treatment of fresh fractures of the patella by uniting the fragments with sutures, great reliance being placed on antiseptic precautions, are not wholly satisfactory.

Of 45 cases reported by Brunner in 1886, only 18 recovered without fever. In 8 cases dangerous purulent inflammation of the joint resulted, necessitating in two of them amputation of the thigh, of which one ended fatally. Kuland (1884) reported six deaths resulting from this operation. Hamilton has sufficiently demonstrated, however, that osseous union of the fractured patella is not necessary for the restoration of its function. This author has reported cases where a considerable space lay between the ends of the broken patella, which were held together by fibrous tissue, and where the necessary movements of the leg were not interfered with. In one case this diastasis measured 3 inches. If osseous union is, therefore, not always necessary, it is questionable whether in all cases of fresh fractures, the suture should be recommended, especially since the introduction of puncture of the hæmarthron and massage of the rapidly atrophying quadriceps. In many cases the hæmorrhage into the joint is very great, so that the capsule is much distended and prevents the adaptation of the ends of the fractured patella. Author removed in 3 cases of this kind, after Schede's method, the hæmarthron with a trocar, attaining in all 3 cases complete union.

The condition of the quadriceps is of the greatest importance for the prognosis in all cases of fractured patella. It is well known how easily this muscle atrophies and becomes insufficient when injured. Careful

and repeated observations have sufficiently well established the fact that the large majority of transverse fractures of the patella, are caused by severe over-exertion and strain on the quadriceps. This may produce considerable injury to the muscle by the tearing of fibres, blood-vessels, etc., the damage done being sufficient to cause its deterioration and atrophy. To this must be added the rest and non-usage necessary for union of the patella. Author believes that such a condition of the quadriceps interferes with full extension of the leg, in more cases than incomplete consolidation of the fractured patella. He attributes the good results reported by Tilanus, in the treatment of such fractures, to be greatly due to the early employment of massage.

The patient is kept in bed, the injured leg elevated and the knee wrapped in an elastic bandage. The latter is removed once in every twelve hours and the thigh kneaded with one hand, whilst with the other the portions of the patella are held together. This procedure should last about ten minutes. Massage should be followed by passive and active movements, in short excursions. After some eight days have elapsed the patient should get up and walk. Six of Tilanus' patients could walk very well in fourteen days. The distance between the fragments became smaller every day in spite of the movements in walking, and the flexion carried out methodically. Rapid union and early employment of motion, are the best means against shrinkage of the capsule, which leads finally to ankylosis. In contrast to cases of old and repeated fractures of the patella, such as Larger demonstrated to the first Congress of French Surgeons where, in spite of non-union of the bone and a considerable diastasis of the fragments, the functions of the limb were quite normal, there are very many cases where these latter are not possible, owing either to displacement or non-union of the fragments, etc. These patients cannot walk without the help of crutches. It is desirable to attempt freshening up and uniting of the fragments, in order to restore to the leg its proper functions. Brunner operated in 45 cases of this kind, in most of which the operation was undertaken after the lapse of a few months. In but 5 of them had a year elapsed since the injury. The results were not satisfactory. Purulent inflammation of the joint took place in 11, necessitating in one amputation of the

thigh; three patients died from pyæmia. Seven of the number recovered with ankylosis, 17 with limited functional power, and 9 with great loss of this. Only 7 recovered full normal mobility of the knee.

If the cases of ulceration, inflammation and febrile reaction are excepted, the chief cause for these poor results is the difficulty in keeping the widely separated fragments together.

The author reports following case, showing his proposed method of treating such cases, by which he believes firm union of the adapted fragments of the patella and maintenance of the extension movements, may be secured:

Patient, a sailor, strong and healthy, æt. 22 years, fell from a mast whilst at sea, fracturing the lower jaw, right thigh and right patella. Patient did not come under medical treatment until some six weeks later. Right leg was then 8 ctm. shorter than the left, the fault lying in the femur, the portions of which had united at an angle in about its middle, the concavity of this angle being on the posterior side. The fragments of the patella, which was fractured transversely, had not united, but were separated from each other by a space the width of the hand. Flexion of the knee-joint was possible to several degrees, but not to a right angle. Extension was not possible at all. It was decided to first rectify the defect in the femur. Incision anteriorly exposing the bone at the point of fracture; callus chiseled off and the ends of the fractured bone brought together. Plaster of Paris bandage worn for fourteen days, followed by extension bandage. About two weeks later wound had entirely healed and union of the bone ends had taken place. Four weeks afterwards the operation to correct the defect in the patella was made. Incision transversely over the knee. The ends of the patella freshened up (by means of a fine saw). Attempts to bring them together, however, failed. A second incision was then made a distance below the first, just below the tuberosity, down on to the tibia. The muscles at that place were pushed aside, the tuberosity chiseled off in an upward direction, so that this portion of bone had a triangular shape with its base upwards, and was attached solely by the skin-covering above it, and the tissues on the

es. This triangle of bone, together with the ligamentum patellæ and



the lower fragment of the latter could be easily drawn upwards, allowing the adaptation of the fragments. Catgut sutures were employed to hold them together. The upper wound was carefully closed, the lower one left open and plugged with iodoform gauze. Antiseptic dressings were applied over all. Dressings removed six days later. Upper wound healed. In five weeks firm union of the fragments was accomplished, the patient making his first attempt to walk a week later. Energetic massage of the muscles of the thigh was carried out from that time on, and active and passive movements of the knee-joint.

After a month of this treatment, patient discharged. Patient cannot bend the knee to a right angle, but is able to extend it with great strength, almost entirely. The portions of the patella are firmly united evidently by osseous tissue, as is also the tuberosity of the tibia, which was displaced upwards.

Author recommends this method of chiseling off the tuberosity of the tibia in order to bring the ends of the patella together, in cases of old fractures, instead of dividing the tendon of the quadriceps. He does not consider it probable that non-union or necrosis of the chiselled off tuberosity is likely to occur. He advises, furthermore, the puncture of the cavity of the joint, when this is filled with blood, and the early employment of massage of the flexors of the lower leg. —*Deutsch. Med. Wochensh.* No. 1. Jan. 6, 1887.

C. J. COLLES (New York)

**IV. On Neuropathic Joint Affections.** By Prof. CZERNY (Heidelberg). The type of arthropathy in ataxics so clearly portrayed by Charcot was attributed by him to tropho-neurotic disturbances. Mitchell, Charcot, Westphal and others have called attention to the frequency of spontaneous fractures in ataxics. Since the fractures and the joint troubles occur frequently in conjunction, both are doubtless to be ascribed to the same cause. Some authors have found pronounced softening and atrophy of the bone, others not; however, thorough exact investigations on this point are wanting. Ataxics having lost the muscular sense and hence the finer regulation of resistance to external force in considerable portions of the body, single bones might be

put to a hard test by an apparently insignificant force striking them disadvantageously. The analgesia of tabetics is very important. An inflamed joint continues to be used long after the time when with normal sensation it would be voluntarily immobilized. This misuse augments the grinding off process. The analgesia may be limited to the deeper nerves, when it is more difficult to determine. The possible etiological connection between the frequent fractures in lunatics and the spontaneous fractures of ataxics was suggested by P. Bruns in 1882. Neumann, in 1883, attributed to a trophoneurosis (from vasomotor trouble) the bone-fragility in psychoses, pellagra, osteomalacy, infantile paralysis, progressive muscular atrophy, locomotor ataxy, leprosy, and various other diseases. More recently spontaneous fractures have been recorded from gliosis and syringomyelitis.

Czerny does not discuss the localization of the central nervous lesion in these joint troubles, but only gives clinical experience.

# I. CASES DIAGNOSTICATED AS LOCOMOTOR ATAXY.

## A--*Ankle Joint.*

1. Psychosis and gray degeneration of posterior columns. Subacute arthritis of ankle, resulting in ankylosis. Amputation.

Man of 53 years. The joint trouble began—after weakness and ataxia of legs had reached a high degree—with œdema and redness around left ankle, increased heat and fixation in varo-equinus position. After subsidence of the swelling crepitation was made out, but no pus was obtained on incising. Analgesia of the left lower extremity was noted later. As the false position was not correctable even in narcosis, amputation was performed. Death from the effects of a complicating erysipelas. The special conditions found p. m. were chronic pachymeningitis, diffuse sclerosis and atrophy of cerebrum and cord, chronic internal hydrocephalus, and gray degeneration of posterior columns. The articular cartilage of each caput humeri was atrophic, the capsule thickening. The bones of the extremity as also of the other appeared rarefied on section (osteoporosis).

2. Very chronic locomotor ataxy of moderate degree. Arthropathy of ankle-joint from sprain. Arthrotomy. Improvement.

This was in a man of 50 years. On opening the swelling synovia mixed with fibrine concretions was discharged. The body of the astragalus appeared to have been quite ground away, the tibia articulating with the calcaneum by a broad joint-surface. Two years later he was still able to get around with a foot support.

*B—Shoulder Joint.*

3. Ataxy of moderate degree. Arthritis of the shoulder joint from a contusion. Resection. Man of 36 years. The contusion was from a box falling on the shoulder. The chronic swelling resulting had been called a sarcoma (from its great size and slight sensitiveness) by one doctor, and by another an incompletely reduced fracture.

On closer examination, tabetic symptoms were found. On resecting, the capsule and long head of the biceps proved to have been destroyed. The glenoid cavity was about intact, head of humerus bare and eroded. No fungosities, but rice-like formations to size of a pea, pedunculated and sessile. When dismissed there was still some secretion from a fistula. Active motion much less than before the operation.

II. CASES WITH THE CLINICAL DIAGNOSIS SYRINGOMYELY.

4. Inflammation of left hand leaving claw position. Suppurative omarthrititis with subluxation. Resection of humerus.

Repeated attacks of inflammation in left arm (hand, shoulder, axilla) with final suppuration about shoulder. The humerus head was found bared of cartilage, soft and ground away. The operation gave a very fair result.

*C—Elbow Joint.*

5. Congelation 20 years previously, leaving claw position of the fingers, loss of the fingers three years previously from a painless inflammation. Arthritis of elbow. Resection. Improvement. The said inflammation had, in fact, attacked three of the fingers, each at a different time. The patient was a man of 42 years. The trouble with the left elbow had been painless and of several months' duration. Despite incision and plaster dressing swelling and suppuration recurred. Joint loose. Two fist-sized swellings back of elbow. Exsec

tion without narcosis was painless. The destruction of the joint ends was so great that the olecranon was dislocated upwards, and the arm appeared shortened 11 ctm. No fungous granulations. Later an independent abscess formed in the bicipital sulcus. On presenting himself a year after resection the joint was found useless, a suppurating fistula lead to carious bone. Amputation refused.

#### D—*Wrist Joint.*

6. Syringomyely. Finger contracture from congelation. Septic inflammation of left index finger and wrist. Amputation. Death from pulmonary metastasis. Pyelocystitis.

All these cases affected men in middle life. Neuropathic individuals are more disposed to all forms of arthritis, and while it may be claimed that these cases belong to the common forms in such persons, still they are so essentially modified and affected by the disturbances in innervation that it is of practical importance to separate them. The injurious influence of the analgesia is strikingly noticeable only in the chronic cases. Pain was present where the inflammation began acutely—perhaps, however, from participation of the cutaneous nerves. The increased vulnerability of the tissues in neuropathics is of great importance. Still, operative wounds and fractures in ataxics heal nicely, as a rule.

As to the diagnosis of these neuropathic joint affections he mentions in the acute cases the rapid deleterious course, in the chronic cases the analgesia, large exudation and great destruction of the joint ends.

It follows that neuropathic disposition is of forensic importance in suits for damage. In all cases of distortion or fracture presenting analgesia or an unusual course, especially if originating from an otherwise insignificant injury, a careful examination of the nervous system is necessary.

As to treatment, beyond the usual indications, here a firm ankylosis in good position is certainly preferable to extensive grinding and loosening of the joint apparatus. From the bad prognosis of joint distortions in ataxics rest for the part and later exact supports to free from pressure are applicable. Too great destruction or dangerous suppura-

tion may call for arthrotomy, resection or amputation.—*Arch. f. Klin. Chirg.*, 1886, Bd. 34, Hft. ii.

W. BROWNING (Brooklyn.)

**IV. Further Contributions to the Operative Treatment of Club-foot.** By Dr. ERNST RIED (Munich). In a former paper the author advanced the opinion that congenital clubfoot was best treated in children by extirpation of the talus, but that cuneiform excision of the tarsus was more adapted to adults.

He now publishes seven cases of operative interference for club-foot occurring in young children; in four of these cuneiform excision was done; in three the talus was removed. He compares the results of both methods together, and decides in favor of extirpating the talus.

It must be understood that the treatment is intended only for those cases where the deformity is excessive; the author does not speak of cases which admit of milder treatment, but only of such as may indicate operative measures.

The advantages of extirpation of the talus over excision of the tarsus consist in preserving the arch of the foot, in permitting the natural development of the other bones of the foot, in forming an almost normal description of foot and in correcting the supinated position of the heel; instead of an anchylosis in Chopart's articulation (as in cuneiform excision), a syndesmosis is formed between the leg-bones and the calcaneus. Nor is there increased danger of the foot's turning over sideways, as Lorenz maintains, after extirpation of the talus.

The disadvantages of cuneiform exsection of the tarsus in young children, on the other hand, consist in the facts that the talus remains, which forms the principal obstruction to the straightening of the foot; that the heel remains in a supinated position; that the arch of the foot is interfered with and the growth of the bones composing it impeded; that by the occurring synostosis the bending of the sole of the foot in walking is rendered impossible and the tendency to walk on the outer edge maintained. Moreover, after cuneiform exsection a more or less ample callus is formed in the line of operation, which occasions recurrence of the trouble, and renders the operation futile.

Rydygier objected to the operation of excision of the talus, because

it necessitated laying open the talo-crural articulation, and because the extremity, generally deficient in length beforehand, was rendered still shorter through the loss of this bone. But under antiseptic precautions the opening of the talo-crural joint is not dangerous, and, although shortening of the extremity may always be observed when club-foot has persisted for some time, the talus projects too far out from the articulation and is far more laterally than vertically developed to cause much shortening.

The removed bone, moreover, may be again, to some extent, regenerated, especially if, as is most always the case, the bone be removed in pieces. Resection of the lower end of the fibula is to be restricted to these cases where rotation is prevented by the fibula dove-tailing into the calcaneus; but this operation as well as severing the calcaneo-fibular ligament may sometimes be done with advantage. In these latter cases the cutaneous incision is to be correspondingly chosen. Bursæ are to be extirpated previous to operating on the osseous parts. The proper age for the operation is the second year. The splint used for fixation of the foot after operation is briefly described.

The six cases that form the basis of the paper were operated in the surgical clinic at Jena, either by the author himself or his father.

We give the last one in short. Six-year old boy with pes varus dexter congenitus, in extreme degree. Had been treated at home at the age of six months with plaster-of-Paris and water-glass bandages, and with mechanical appliances. Walks on two bursæ, one over cuboid, the other over talus bone. Extirpation of talus with partial resection of calcaneus and cuboid. Iodoform dressing. Primary union. Two months later boy stands on sole of foot. Dismissed with a splint-shoe. Eighteen months later boy could walk in an almost perfectly natural manner. The foot had grown. Motion in the new joint was free. The whole sole touched the floor. Lower extremity not shortened; foot a little shorter but no narrower than the other. Firm osseous union between calcaneus and cuboid, with slight callus. The boy is in no wise impeded by his foot, can run, jump and walk.—*Deutsch. Zeitschr. f. Chirg.*, vol. 23, Hft. 5 and six. June, 1886.

W. W. VAN ARSDALE (New York).



## GYNÆCOLOGICAL.

**I. The Mortality of Primary Laparotomy in Cases of Extrauterine Pregnancy.** By ROBERT P. HARRIS, M.D., (Philadelphia) The writer considers as *primary* only those operations which are performed not only while the *foetus* is living but after it has reached a viable period of gestation, and when the operation can be undertaken in the interest of two lives. In this respect he departs from the classification of Hutchinson, who attached the term *primary* to all cases in which an abscess opening through the abdominal wall had not formed. Of the 25 cases of primary laparotomy for ectopic gestation, as defined by Dr. Harris, 23, or 92%, were fatal, with a loss of 18 children. The most frequent cause of death was hæmorrhage, of which 12 died, 4 each died of peritonitis and collapse or shock and exhaustion, 2 from septicæmia and 1 from heart-clot. In case the placenta is implanted without the uterus, as is ordinarily the case, there can be no contraction of its basis after the removal of the *foetus*, and the process of exfoliation must produce more or less hæmorrhage; if it be implanted upon the abdominal wall in the line of incision early death results; to remove the placenta from its attachment to the viscera during the operation must be necessarily fatal, and it has not been attempted in this class of cases, so far as known for forty years. He refers to a recent operation by Joseph Price, of Philadelphia, in which the child lived four hours and the mother fourteen days, finally succumbing to hæmorrhage. If the primary operation is ever to be one of diminished risk, he considers that it must be made so by one of two methods: (1) the ligature of the vessels supplying the placenta and its removal with the cyst; or (2) by antiseptic treatment of the placenta, to prevent its decomposition and separation.—*Med. News.* May 21, 1887.

**II. Laparotomy in a Case of Extrauterine Pregnancy.** By G. BOUILLY (Paris). A woman, *æt.* 39, had not menstruated for six months; she had felt motion but all movements had been suspended for the last fortnight, and she had symptoms of the appearance of milk in the breasts. The abdomen was enlarged especially at the

umbilical region, by an indolent tumor, regular and fluctuating above, irregular and hard below. The diagnosis was doubtful between a multilocular ovarian cyst, with or without a uterine fibroma, a cystic fibroma and an extrauterine pregnancy, which the enlargement of the breasts contributed to render probable. Exploratory puncture was fruitless. Seven days later she was seized with pains analogous to those of labor, and the cervix became dilated. These pains continued during the following days, accompanied by tympanites, and on the third day missed labor with peritonitis was diagnosed. Laparotomy was performed on the third day following. Incision through the median line exposed, immediately upon the opening of the peritoneum, a macerated fœtus, lying between the anterior abdominal wall and the intestines, with the uterus on the right and the iliac fossa on the left. It weighed 1,726 grammes and was easily removed. After its extraction, there were still left below, two large masses; on the right the uterus covered with lymph deposit, and on the left, down in the pelvis and attached to the posterior face of the left broad ligament, the placenta with the cord inserted into it; it was so firmly adherent that it had to be left in place. The toilet was made with hot carbolized water. The upper part of the abdominal wound was sutured and the lower angle was occupied by the cord and two large drains; iodoform dressing. After the first day, daily injections of sublimate solution were introduced to assist the elimination of the placenta, which occurred in four weeks by insensible exfoliation with a scanty and non-septic suppuration. Two months after the operation, she left the hospital with a small fistula which closed up a few days later, after the discharge of a suture.—*Société de chirurgie de Paris*, Dec. 1886.

**III. Successful Primary Laparotomy for Ruptured Tubal Pregnancy.** By A. W. JOHNSTON, M. D. (Danville, Kentucky) A woman, æt. 32, the mother of one child æt. 8, two months advanced in pregnancy, was seized with severe pelvic pain, with a considerable amount of shock; two days later she had entirely recovered from the general symptoms but high up to the left of the uterus was a mass about the size of an orange, which was exquisitely sensitive and obscurely fluc-

tuating ; the uterus was pushed slightly to the right and enlarged about one third, but much firmer than the ordinary pregnant uterus. On a tentative diagnosis of extra-uterine pregnancy, laparotomy was suggested but declined, and an expectant treatment by hot injections, morphine etc. adopted. She however developed a severe general peritonitis, and a month after her original attack, a three months foetus was removed by abdominal section from a much thickened and ruptured tube, and a large amount of clots turned out. The depression attending the operation was great but after a tedious convalescence, the patient recovered.—*N. Y. Med. Rec.*, Feb. 26, 1887.

**IV. Hernia of the Right Ovary; Successful Removal of the Gland.** By CHARLES MCBURNEY, M.D., (New York). A woman, æt. 28, stated that she had suffered for sixteen years with a right inguinal hernia, for which she had worn a truss ; the tumor had always been reducible, although at times with some difficulty. In the right labium was a semi-fluctuating tumor, painful on pressure and giving no impulse on coughing ; an attempt to reduce it caused severe pain in the head and nausea. Hernia of the right ovary was diagnosed, and, on cutting down upon the mass, a hernial sac was found and laid open. The appearances presented were those of ordinary congenital hernia ; there was a persistent pouch of peritoneum but no intestine could be found ; on its posterior wall at the lower end was a mass half an inch thick, covered anteriorly with thickened peritoneum ; at the lowest portion of the tumor was a quantity of fluid in which floated a collapsed sac, while at its upper portion was a distinct constriction which admitted a fine probe, while above this point was an ordinary hernial tract. Microscopical examination of the mass in the posterior sac revealed in it ovarian stroma. The anatomical relations of the gland were the same as those of the testis in a case of congenital hernia. The sac was ligatured with catgut at the level of the internal ring, and excised, the patient making a good recovery.—*N. Y. Surgical Society*, May 11, 1887.

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## NOTES ON PLASTIC SURGERY.

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THE principles and practice of antiseptic surgery are as essential for the complete success of plastic as for that of other classes of surgical operations. Many surgeons who take "the strictest precautions" when operating on joints, take none whatever of an antiseptic nature when interfering with the rectum, the mouth and other parts whose absolute exclusion from all germs is impossible. To the believer in specific germs such a practice appears inconsistent and illogical. And I can vouch, from my own observation, that it is not unproductive of evil results. There is a kind of half-expressed but very real idea floating in the minds of many surgeons that such operations as those for hare-lip and piles are exempt from the risk of septic diseases. A few months ago I saw a surgeon most astonished that a case in which he had tied hæmorrhoids, had been attacked with erysipelas. He had operated in a general hospital and used no antiseptic precautions whatever. He did not know the recent history of the instruments, sutures or dressings used, or of his assistants' or nurses' fingers, and yet he was astonished beyond measure when erysipelas occurred. The same surgeon would not have even aspirated the knee-joint without using the spray or the douche. It would be easy to multiply indefinitely similar instances of inconsistency.

It will be granted that all parts of the body are susceptible to septic inoculation, therefore one of the first rules of plastic surgery should be: *Thoroughly disinfect the parts to be operated on, the hands of surgeon, assistant and nurse, the instruments, sponges, ligatures, sutures and dressings.*

As a preliminary to the use of such germicides as sublimate and carbolic acid, a prolonged washing and scrubbing with the liquid potash soap of Dr. Duncan, of St. Petersburg, is very useful. This soap has two excellent properties, (1) it is an extraordinarily powerful solvent of dirt; (2) it is itself instantly soluble in cold hard water or antiseptic lotions, so that it may be said to promptly "do its business and go about its business."

But, bearing in mind that in plastic surgery, one almost always desires union by the first intention, and that irritants such as the stronger germicides are not favorable to that, *an ideal plastic operation should be aseptic rather than antiseptic.*

For this reason I generally, while keeping the instruments in a tray of carbolic, dip them into a basin of recently boiled, not boiling water<sup>1</sup> before touching the patient with them. But when they are even temporarily laid down again, it should be either into the tray or upon a damp carbolised towel, disposed around or near the site of the operation.

The same recently boiled, not boiling, water is used as a douche and for the sponges.

Some persons would prefer boracic lotion. I greatly doubt whether it has, for these purposes, any advantage over the boiled water. If the operation were to occupy days instead of say half an hour, it would be a different matter.

*With regard to ligatures*, they should scarcely ever be used in a plastic operation. Temporary pressure with sponge or forceps almost always suffices to check hæmorrhage. The boiled water used at a temperature of about 120° will assist. Hare-lip pins or silver sutures can be often arranged to not only adjust the parts but also at the same time to control an obstinate vessel.

The objections are manifest to a number of catgut knots in a wound where perfect antisepsis is impossible.

I believe it may be laid down as an axion applicable to surgery in general that *even with the aid of antiseptics, the difficul-*

<sup>1</sup>A handy way in which I think aseptic, as distinguished from antiseptic, water could be quickly produced would be by adding iodide of potassium to sublimate lotion until all the mercury was precipitated, but I have never tried this plan.

*ty of obtaining union in a wound without suppuration increases geometrically with the length of time a foreign body is left unabsorbed in the wound.* I may not be expressing myself properly, but I mean, for instance, that when in a simple osteotomy, even though it be done antiseptically, a large splinter of bone be chipped off and left in situ, suppuration is ten times more likely than if no such splinter had been made. Very probably it is the case that, even with carefully applied antiseptics, a few germs find their way alive into the wound, but their chance of surviving and multiplying depends mainly upon their finding or not finding some dead or half dead organic nidus to receive them.

It is, therefore, particularly desirable to keep catgut out of wounds when complete antisepsis is not only difficult but often impossible.

As a prophylactic against tedious and troublesome hæmorrhage the preference of scissors to the knife for the division of all structures except occasionally the skin itself, is to be strongly urged. With regard to the skin, in dividing it the precision attainable with a sharp scalpel recommends the latter.

A classification of plastic operations may be made into two grand divisions, namely, (1) those in which flaps are transplanted, and (2) those in which they are not. As examples of the latter class may be cited the usual operations for recto-vaginal fistula and for cleft palate.

Skin flaps with pedicles should contain the fat right down to the deep fascia, but not, as a rule, that fascia itself. In this way the maximum of vitality can be secured for the flap and the minimum of damage done to the part from which it is taken. It is true that the blood-vessels which nourish the fat pierce the deep fascia, but they do so only at intervals and often in definite places described in the manuals of anatomy. Therefore in some cases they need not be divided at all by the reflection of the flap, while in others valuable and sufficient circulation is left by the anastomoses. The latter condition is particularly found in the face, from which flaps may be freely reflected with their bases in any direction and any position.

An excellent example of flaps containing large undivided



blood-vessels is seen in a common form of operation for extroversion of the bladder. The two lateral flaps taken in case I (appended) are supplied by vessels which emerge from the saphenous opening or through the fascia lata near it. The prime importance of ample blood supply to flaps is evidenced by the extraordinary vitality of scalp flaps, which one of the older surgical writers forcibly said would survive, even if pounded up with a pestle and mortar.

Skin flaps should be reflected cleanly from the deep fascia. It is useless to take the fat if in reflecting it, the knife or scissors be allowed to chop and clip and nick it all over. The fat is not taken for itself but for the vessels which it contains and the connective tissue which contains it.

It is probably desirable to avoid needless chilling, and therefore warm douches and lotions are preferable to cold.

When a flap is to be transferred from one part to another not normally in immediate contact with it, the parts which are to give and receive the flaps respectively, should come easily together without strain and without constraint. As each may have to remain in a fixed position for a week or a fortnight, it is right that the position should be one as comfortable as can be contrived. For example, the position adopted in case II is one spontaneously taken by many persons during sleep, or is at least a near approach to it. Joints should be neither acutely flexed nor fully extended. Above all limbs should not be strongly twisted.

*Fixation.* The chief agents at our service are sutures, strapping, plaster of Paris, bandages and splints.

The sutures must be sufficiently strong and not too near the edge of the flaps. It is when operating on the face that the temptation is greatest to make the sutures too delicate, or to place them too near the edges of the parts sutured. It is especially near the pedicle of a flap that the sutures should be strong. There the vitality of the flap is greatest; and there, consequently, tension can be best borne. The very opposite is the case towards the extremity of the flap. In that situation great and continued tension would make sloughing almost inevitable. Sometimes, in spite of every care, the distal half of a transplanted flap perishes, while the proximal half does well.

One of the greatest advantages of the procedure which I have termed "Transplantation by Exchange," is that the thickest and most powerful sutures may be placed as deeply as the surgeon likes and left as long as he likes in the flap which is transferred *from* the face or neck. In this way the parts operated on are firmly anchored together and comparatively fine sutures suffice for the flap transferred *to* the face. See case II.

As a rule, silver is the best material for the sutures of the plastic operations. It does not absorb discharges as silk does, and it does not stick to its bed like catgut; it can therefore be removed on any day without causing disturbance.

When the position of some of the sutures is such that they can only be inserted with difficulty while the parts to be joined are placed together, tags may be inserted into the parts whilst they are separate and tied or twisted together when the parts are approximated. This, however, is not a plan which is often useful.

The order in which sutures should be placed resembles that in which a painter's canvas is nailed to its wooden frame-work. Salient and opposite points are adjusted first and afterwards other points between these and so on.

A thorough douching should follow the suturing, and then dressings should be applied and secured—of these, more by and by.

*Strapping.*—This article, of the best quality and in long, broad strips, should be freely used to fix together parts placed in contact for purposes of transplantation. No bandages whatever can be compared with strapping for this purpose.

*Plaster of Paris.*—Well-fitting cases or splints of plaster bandages over flannel or woven bandages admirably protect and secure parts previously fixed with strapping. Any little (or even considerable) soaking with discharge or saliva during the ten days they are perhaps left in position is a trivial matter compared with the end attained. Sometimes the soaked part can be cut away without spoiling the case. Plaster cases for the purpose in question do not need to be thick and heavy.

*Splints* of wood or of poroplastic or of some other material often suffice.

With regard to bandages, it is well known that those of car-

bolised gauze are the best for keeping in place, and calico ones perhaps the worst.

Two important questions are : (1) *How long should sutures be left in situ* when neither of the parts united is to be severed from its original attachment, and (2) *On what day should we divide the pedicle of a flap* which is to be completely separated from its original site.

The answer to the former question depends on the amount of tension, on the age of the patient and on the "vitality" of the parts. Four days sometimes suffice, but often a week at least should be given, and it is better to err on the side of excess than on the other side.

Ten days is not too long to wait before dividing a pedicle of a flap.

When the pedicle is divided it must be adjusted, and, if necessary, sutured to the corresponding border of the space in which it now lies. At the same time the other margins of the flap may be found to require readjustment. But the greatest gentleness and very delicate handling must be practised at this early period. Careful dressings of iodoform gauze or boracic lint or ointment must be persevered with until healing is complete.

An inconvenience which is unavoidable is the tendency of the wound to contract *while* the transplanted part is forming adhesions to it. When once the adhesions are formed and, so to speak, confirmed this tendency may cease. But, in the meantime, supposing wound and flap to have been originally exactly the same size, an appearance will have resulted of the flap having been originally cut too large. The contraction all round the flap also raises it, and it appears too thick as well as too great in area. This thickness can be reduced by pressure, and the pressure can be conveniently applied to small areas by means of a large coin wrapped up in lint and fixed by strapping. In spite of all this, I should be loth to cut a flap smaller than the wound it was to fill. I am writing now of such a wound as that made by the excision of a mole on the face [*e. g.* case II.] Instead of the size of "the wound" I should have said the size of "the part removed." It is to the latter, before the parts are disturbed that the size of the flap

to take its place should be adjusted, for, of course, when once the knife has touched either part, retraction commences. When transplantation is done to counteract contraction after, *e. g.*, a burn, it is seldom necessary to be exceedingly particular about the size of the flap. Its position and origin are far more important.

The readjustment of a flap, or of a part of it, may be so extensive as to amount to a second transplantation of the whole or of a great part of it. This might be called "*transplantation by two stages.*" For example, in a case where "wry-neck" followed a burn the first object, namely to get a flap from the shoulder to the neck could not possibly be achieved at the same time as the perfect arrangement of the transplanted flap in its ultimate position, because the position of the head and neck while the shoulder was attached to it, "folded up," as it was, the wound in the neck. When such a two-stage operation has to be done, weeks if not months should be allowed to pass between the transplantation and the replantation. Because it must be long before a transplanted flap obtains, through any of its borders, a blood supply nearly comparable to that which it had through the pedicle which once attached it to its original situation. Indeed it perhaps never does. Sometimes one can plainly observe a transplanted flap pale while the surrounding skin blushes.

*In plastic operations one should avoid attempting to do too much and especially too much at one stage.* For instance in case I, the effect of attempting to completely close in the cavity of the bladder, leaving only a small orifice about, say, the calibre of a normal urethra, would have been to force urine to escape in different situations, and, perhaps, to prevent union of the flaps here and there or even all over.

Another ill effect of attempting to do too much at one time is that it leads us to exercise too much tension, than which nothing can be more unfavorable to union.

Flaps may contain other structures besides skin, in fact any tissue of the body. In Pirogoff's amputation we have a plastic operation in which a flap contains bone, namely part of the os calcis. Flaps containing bone have been used in operations for the formation of a new nose. Flaps containing periosteum

are used in operations for cleft of the hard palate. In these instances the deeper structures are preserved for their own sakes. In case III all the soft structures of the sole and sides of the foot are preserved for the sake of the nutrition of the skin, the immediate object being to preserve the plantar arteries. But, as a rule, the structures below the deep fascia are useless in a flap, and, as also interference with them increases hæmorrhage, and the injury to the region from which they are removed, they should be let alone.

When a surface has to be refreshed or made raw it is a well-recognized rule to avoid taking away and wasting tissue wantonly. But it is absurd to be finicky over mere cicatricial tissue, as I have sometimes seen surgeons be when dealing with ruptured perineum and recto-vaginal fistula, cicatricial tissue is easily distinguished, and, being inferior in vitality, is best removed.

A typical instance in which the refreshing should be done with little or no clipping away of tissue is furnished by the operation of closing an old and cicatrised slit in the cheek.

Until cicatricial tissue is removed, it is impossible to distinguish and separate into natural layers, skin, muscle, etc. Unless this be done, buried sutures cannot be used to the best advantage.

*Buried sutures* are of the greatest value in many plastic procedures. They not only insure union, but they prevent depressed cicatrices, and often restore the functions of deep parts, such as tendons and nerves, in a manner that cannot be rivaled by any other means.

To illustrate the application of the principles noticed above I append a few cases, briefly sketched.

CASE I. *Extroversion of the Bladder*. An ordinary example. Patient boy aged about 10. His clothes being constantly wet with urine, the poor lad had, as is usual in such cases, a strong urinous odor, and the skin over the hypogastrium and the groin was covered with an erythematous eruption. The appearance presented by the extroverted bladder was aptly compared by the ward nurse to a tomato.

The erythema having been greatly lessened by the use of unguents for a few days, the parts were, the patient being anæsthetized, very carefully



cleansed and asepticised as much as possible. The operation performed was that in which three flaps are cut: (1). A median one which has its base towards the bladder and its distal extremity towards the umbilicus. (2 and 3). Two lateral ones, each with its base towards the saphenous opening and its inner border alongside the bladder. These flaps took in all the soft parts down to and, in this case, including the deep fascia. Therefore the aponeurosis beneath was exposed. An operation like this differs essentially from a plastic operation on the face or neck, in that the prime indication is to obtain powerful, well nourished flaps and a deep, strongly marked cicatrix is comparatively unobjectionable.

The flaps were first outlined with an aniline pencil, and then immediately with the knife, for the aniline soon washes off. The knife is next made to cut down and through the deep fascia at one spot, and then a director is passed beneath the deep fascia, and, with its aid the outline of the corresponding flap cut everywhere completely and quickly to the required depth.

In many plastic operations a little reflection will discover a reason for turning back one flap or for refreshing one surface before another. In this case it was best to reflect the median flap before the lateral flaps; because the first was closely attached to the linea alba and had to be carefully cut and snipped free, while the last were easily stripped back, scarcely requiring a touch of knife or scissors. Therefore the first bled most and longest. It saves time to deal first with the parts in which the most hæmorrhage is likely to be caused. This bleeding can usually be stopped by pressure kept up while the other parts are being dealt with. A sponge should be put on and kept on, not renewed from time to time. Hæmorrhage is not checked by "dabbing" a sponge on and off.

As the scissors snip the attachments of a flap, they should cut away from and not into the flap.

Wells' or Pean's forceps should be placed on bleeding points of any size. They were used in the case under description, and not a single ligature.

As, in this operation, the median flap has to be turned down and the two side flaps brought over it until they cover it and meet one another in the middle line, three sets of sutures are required, viz.: (1). To join together the two lateral flaps. (2). To join them to the median flap beneath. (3). To bring together the edges of the gaps left by the reflected flaps. There is scope for a little ingenuity in arranging the third set. They should be placed in the way best calculated not only to cause least tension on themselves, but also to take



tension off the transplanted flaps. Hare-lip pins and twisted sutures are the best for the first and third sets. For the second set I employed in this case two stout silver sutures, each fixed to a round and flat lead button. These buttons lay in contact with the badder, and the sutures being carried perpendicularly through first the median flap and secondly the lateral flaps (one to each) were tightened and secured with lead split shot.

The parts having been well douched, were dressed with iodoform gauze. The patient was then sent to bed with his legs crossed and his thighs moderately bent on his abdomen. This position thoroughly relaxed the parts. He was kept in a half sitting position for a week, so that the urine might not flow over the groins and the flaps, by which time very good union was obtained: but the sutures were not all removed for a fortnight.

A second operation of a simple description, without flaps had to be done to reduce the size of the orifice into the bladder. This gave the patient power to pass all his urine into a urinal. He is therefore now entirely free from his old discomforts, and instead of the old tomato-like tumour has a hypogastrium disfigured only by a few cicatricial lines and a small aperture through which the urine flows. I have not interfered with the epispadias yet: perhaps I never shall. I of course feel some anxiety lest pubic hairs should grow into the bladder, but if they do, I think I am prepared to deal with the misfortune.

CASE II. That of a female infant three weeks old with a hairy mole covering nearly the whole of its left cheek, the hairy mole of the face exchanged with a patch of smooth white skin taken from the arm.

On April 2, 1886, at the West London Hospital the little patient being anæsthetized, I first thoroughly cleansed and disinfected the cheek and arm with liquid potash soap (Duncan's) and solution of perchloride of mercury, successively. Next I marked out the flaps in the following manner: A straight ink-line was drawn from *A* to *B* (see illustration). The arm was then placed in comfortable position, arching upwards over the face and head. The wet ink on the line *AB* printed a second line on the arm at *CD*. A paper pattern of the flap to be removed from the face was cut, and with its aid an exactly similar flap was marked out on the arm, so that *CDHG* on the arm corresponded to *BAEF* on the face, each letter to each respectively. Though this is a very simple matter, some care is required in practice to avoid confusion.

The face flap was reflected first. It included the subcutaneous fat proper, which had to be carefully separated from the cushion of fat which swells out into the middle of the cheek from beneath the ramus of the jaw; and it was necessary also to cut very carefully and *see* everything which was divided near the parotid and some of the branches of the facial nerve. The structures in an infant's face are, of course, comparatively small and near to each other, and the amount of fat is, comparatively, very considerable. Almost all the cutting throughout the operation was done with scissors, and not very sharp ones either. The main object of this was that bleeding might stop rapidly, and thus dry surfaces be obtained speedily—a very important matter in a plastic operation. This object was entirely attained in the case I am describing. The arm flap also included the fat down to the deep fascia.



FIG 1. MOLE OF FACE TO BE EXCHANGED FOR SKIN FROM ARM.

The angles between the arm and face, near the flaps, were now packed with iodoform gauze, and the whole arm was most carefully fixed to the head and neck with good strapping. Finally, over sufficient flannel and wadding, the head and thorax and *both* arms were rigidly secured in plaster-of-Paris. The whole had somewhat the appearance of a large egg with an infant's face peering out of a hole near one end and its hips projecting and legs kicking freely out of the other end. The child's conduct showed that it was free not only from pain, but even from discomfort.

The following notes of the after-treatment were made by the house surgeon, Mr. Harold Des Vœux: April 9 (seven days after opera-

tion): Part of case removed, dressings found to be very offensive; both flaps looking well, though the face flap is red and the stitches along its anterior border have given way; dressed as before. 13. Whole case removed and bases of flaps cut and sutured respectively to face and arm. This, of course, liberated the arm from the head and severed each of the two transplanted flaps from its original connections, completing the exchange of places. At the lower and outer border the flap upon the face was found to be not adherent and partially redundant, owing to cicatricial contraction of the face-wound; it was therefore pared to fit, and re-sutured to the face. Wounds dusted with iodoform; both arms strapped to body to prevent child from scratching the wounds. 20. The face flap not fitting perfectly in one or two places, it was there refreshed, adjusted, and fixed with fine horse-hair sutures.

The following account of the state of the case, nine months after the operation, is written by Mr. C. H. Taylor, house physician to the West London Hospital, who has just visited the little patient to report on it: "The child is much fatter and healthier in appearance; the transplanted skin on the face is of the same colour and appearance as the rest of the face; all that is noticed is an incomplete, irregular ring of depressions, or dimples and linear scars, these being slightly paler in colour than the surrounding skin. At the outer and lower edge nearest the ear are two small patches of mole, one about the size of a pea and the other smaller;<sup>1</sup> they are pale-brown in colour, and have a few silky hairs growing from them. The arm is much fatter, and the mole upon it is more raised and movable than it was upon the face, but it remains the same in size.

There can, therefore, be no doubt about the satisfactory results attained by this mode of operating, which is, to the best of my belief, new. It is obviously a very great advantage to be able to anchor, so to speak, the arm to the head by the strong sutures which unite the former to the transplanted mole. It is thus rendered needless to put any except fine sutures into the face. Secondly, the bases or necks of the two flaps, lying with their raw surfaces in mutual contact, help to keep up each other's warmth and nutrition. Thirdly, not only is the risk of sloughing diminished, but should the part removed from the arm slough, the mole saved from the face is there covering the arm-wound with healthy and supple, though discolored and abnormal, skin. I

<sup>1</sup>These small patches lay near the border of the large mole when it was transplanted, and were left behind. Other details of this case are given in the *London Lancet*, February 19, 1887.

cannot help thinking this plan of preserving what might be termed "healthy disfigurements" of the face, such as hairy moles, and exchanging them for skin taken from parts usually hidden by the clothes, to be a great improvement on the practice of excising such moles and wasting them.

CASE III. A "modified Syme," a plastic operation by which the sole of the foot is transferred to the front of the leg, covering the *shin* where it had been laid bare by an ulcer.

John J., aged 46, suffered from an ulcer which extended from the junction of the upper and middle thirds of the leg down to about two

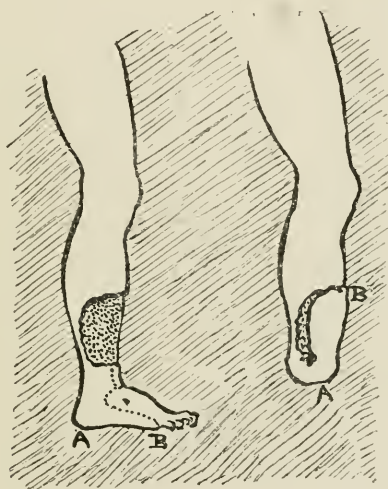


FIG. 2. AMPUTATION OF FOOT, WITH USE OF SOLE AS FLAP TO COVER ULCER OF LEG. 1, showing site of ulcer and direction of incisions to make flap. 2, flap in place at end of operation.

inches from the ankle-joint, and passed round towards the posterior aspect of the limb, so as to leave a breadth of sound skin, only two inches wide, for a short distance. He applied at the West London Hospital, asking not to have the ulcer healed, but to have the leg amputated. He knew, by experience, that the healing of such an ulcer, even if possible, was a delusion and a snare.

Measurements showed that the soft tissues of the sides

and sole of the foot would be sufficient to cover the whole length of the ulcer, provided an inch was sawed off the tibia, but that a strip of ulcer, about two inches wide, would remain uncovered on each side of the leg. It was necessary also to bear in mind that when the granulations and untrustworthy borders were scraped away there would be further retraction. I should say that the size of the ulcer, as I have above described it, was its size when greatly diminished by two months' rest and treatment in hospital, owing to a severe attack of erysipelas which had nearly been fatal.

The operation is described in detail in the *Lancet* of November 28, 1885. The principles recommended above were carried out in this case; and the patient was shown in excellent health and with a sound leg, flap and stump at the London Clinical Society on November 13 (three months after the amputation). But even six weeks after the operation he had thoroughly convalesced as regards the local appearances. The diagrams explain pretty clearly what was done. All the soft tissues of the sole and sides of the foot, except loose tendons, were included in the flap transferred to the shin.

Where the edges of the flap did not reach the sides of the raw surface to be covered, no stretching was employed, but silver sutures were carried across little "bridges" of lead.

I will deal with the use of buried sutures in plastic operations (especially when performed on the perineum or on the face and head) and with transplantation without pedicle in a future contribution.

LIGATION OF THE EXTERNAL CAROTID ARTERY.<sup>1</sup>

A SYNOPSIS OF FIVE SUCCESSFUL CASES.

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PRIOR to 1878 there were recorded only 67 cases in which the external carotid artery alone was tied; 3 of these died, and these fatal cases were from gunshot wounds in military practice. One died on the table from the effect of hæmorrhage before ligature could be applied. In the other two the cause of death is not given. Of the 67 cases hæmorrhage after deligation occurred in 5, none of which proved fatal. In 4 of these the bleeding was noted as at the seat of lesion beyond the ligature, and in 1 the point where the hæmorrhage occurred is not stated. The artery was tied on both sides in 2 patients, and all recovered.

Since the demonstration by myself in 1878 of the comparative regularity of origin of the branches of this vessel together with the great mortality following deligation of the common carotid, as shown by an analysis of seven hundred and ninety-four cases, the application of the ligature to the common trunk for a lesion in the distribution of the external carotid, beyond the origin of the lingual branch, has been abandoned, and deligation of the external trunk has become the accepted operation.

The introduction of the catgut ligature has added an element of safety to this operation which has, in my opinion, almost entirely removed the danger of secondary hæmorrhage. Without further discussion of its merits, I wish to add to the record the following cases:

<sup>1</sup>Read before the New York Surgical Society, February 23, 1887.



CASE I.—M. M., a carpenter, æt. 56, married, American, came under my care through the courtesy of Dr. Boyley, of this state, on January 6, 1885. The patient's history contained nothing of interest, with the exception that he had been a constant chewer of tobacco until one year before, when he stopped on account of a painful sore which appeared on the left buccal wall, at the point where he was in the habit of holding the tobacco as it was being saturated with saliva. The ulcer and induration gradually spread, and when I first saw him there was an evident epithelioma involving the buccal wall and a limited portion of the alveolus of the lower jaw. The lymphatic glands of the left upper carotid and submaxillary triangles were enlarged and indurated. On January 9, under ether narcosis, I dissected out the glands, and, partly in order to prevent bleeding, but chiefly to retard the recurrence and further development of the neoplasm, placed a catgut ligature around the left external carotid artery below the lingual and about a third of an inch above the bifurcation. As is my rule of practice, I also tied the superior thyroid artery about a quarter of an inch beyond its origin. Antiseptic dressing, a bone drain, and silk sutures were used. I then excised the epithelioma, cutting well away from the margin of the disease. The patient recovered without hæmorrhage or any unfavorable symptoms, and on the 31st, twenty-nine days after the operation, he left the city for his home.

CASE II.—P. H. W., American, æt. 37, a journalist, married, came to me, through the kindness of the late Professor Frank H. Hamiltinn, on June 26, 1886. He had for years been a confirmed smoker of cigars and cigarettes, and, fifteen months before I saw him, a painful ulcer had appeared on the lower surface of the left side of the tongue near the tip, just where the end of the cigar rested while he held it between his teeth and lips. When I examined him the anterior portion of the tongue was indurated and swollen in part and in part occupied by the characteristic ulcer of epithelioma. The posterior limit of the induration crossed the tongue obliquely, being about an inch from the tip on the right side and two inches along the left border. The glands of the left side of the neck were infiltrated. On the 29th, the patient being anæsthetized with ether, I dissected out the glands of the neck (left side) and tied the external carotid a quarter of an inch above the bifurcation of the primitive trunk. The superior thyroid was also tied. Catgut ligatures were employed, also a bone drain and catgut sutures. I then extirpated the tongue and floor of the mouth. The organ was divided an inch behind the line of induration. The patient recovered without a bad symptom and is now (eight months after the operation) free from all evidence of epithelioma and in active business.

CASES III and IV.—Z. M., æt. 47, housewife, a native of Italy, came under observation June 14, 1886, having been sent to my clinic at the polyclinic by the kindness of Dr. Abruzzo, of this city. Sixteen months before this date, following the cessation of her menstrual flow,

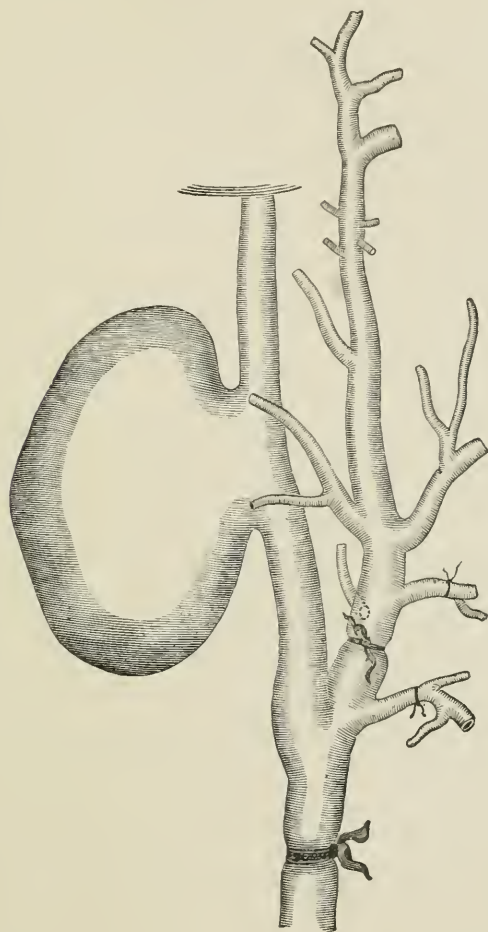


FIG. 1. SHOWING LOCATION OF THE LIGATURES APPLIED IN CASE V.

she noticed that the parotid gland of each side was enlarged. The swelling of these organs continued, the mouth became dry from lack of saliva, and deglutition was difficult. Up to the time of the appearance of the tumors of the parotid the

On her admission into Mt. Sinai Hospital, the tumors were of about equal size, extending from the upper level of the ear to the level of the chin. A diagnosis of bilateral sarcoma was made. The patient was told that an operation would very probably not effect a cure, and that facial paralysis would result. She insisted upon an attempt to give her even temporary relief. On June 14 I tied the right external carotid, between the lingual and the bifurcation of the primitive trunk, preliminary to the removal of the neoplasm. The superior thyroid was then tied. The hæmorrhage during the dissection was insignificant. The wound healed quickly, and on September 21 the second operation was performed. On account of the extension of the tumor down the neck, I had great difficulty in getting at the external carotid, which was entirely overlapped by the new growth and was pressed deep into the neck. The bleeding was so troublesome that I threw a temporary loop of catgut around the common trunk, an inch below the bifurcation, which controlled the hæmorrhage until I passed the ligature around the external trunk. After removing the neoplasm, I found the ligature had been applied on a level with the crotch of bifurcation. This was nearer the primitive trunk than I had intended, but when it was applied I could not see the exact location of the ligature on account of the tumor. It was left in this position, and the superior thyroid was also secured. No bleeding occurred, and the patient recovered and left the hospital on March 9. This is probably the only case on record in which the ligature was applied so low, and it well demonstrates the safety and efficiency of the catgut. The microscopical examination of one of the neoplasms proved it to be a round-cell sarcoma.

CASE V.—In this case the common and external carotid artery and the superior thyroid branch were tied for aneurism of the internal carotid, (See Fig. 1). The internal trunk was affected with atheroma to such an extent that the ligature could not be applied to this vessel. The operation was done on July 24, 1883. The tumor rapidly diminished in size, the patient leaving the hospital on the twenty-third day after the operation. She is now living and well.

THREE CASES OF LIGATURE OF THE EXTERNAL  
CAROTID ARTERY, IN TWO OF WHICH  
BOTH VESSELS WERE TIED  
SIMULTANEOUSLY.

WITH REMARKS ON THE HISTORY OF THE OPERATION.<sup>1</sup>

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I THINK it to be both proper and essential to recall, in connection with these cases, something of the early history of the operation, even at the risk of adding burdensome details to a subject that has so recently been considered by the members of this society.

The first case, of which a definite record can be found, was operated on by M. Gensoul, at the Hotel Dieu, September 20, 1824, while he was engaged in the removal of the parotid gland for malignant disease. There is no reason to believe that he, at that time, considered the ligature of this vessel as one of the steps to extirpation of the parotid gland. It appears, rather, that the vessel was tied during the course of the operation, without this step having been considered as a special preparatory measure. I think it safe to assume, in view of the relation of the parotid gland to this vessel, that the surgeon who extirpated the gland first was the one who first tied the external carotid artery. To Beclard belongs the credit of having furnished the first reliable account of the removal of this gland, which he himself removed in 1823. M. Gensoul repeated the operation.

The surgeon who first tied the external carotid as a preparatory measure, of which a definite record can be found, was

<sup>1</sup>Read before the New York Surgical Society April 27, 1887.

George Bushe, of the Royal College of Surgeons of Ireland. It was performed in a little patient of about ten and a half years of age, to check a severe hæmorrhage following the removal of a pulsating nævus from the temporal region. The removal was not attempted, however, until all other recognized expedients had failed. The little patient made a rapid and satisfactory recovery, which pleased the operator so much that he expressed himself as follows :

"I shall trust in the future to ligature of the external carotid in such cases, and here I may say that, where the disease is not in the orbit, I cannot see the necessity of securing the common carotid for anastomosing aneurism of the face and head."

In connection with the remarks just quoted, I will call attention to the history of the first of the three cases operated on by myself.

The patient was admitted to the Bellevue Hospital August 1, 1883, æt. 24, family and personal histories good. About six months before admission he was struck in front of the left ear with a bottle, which was broken by the force of the blow. The wound of the scalp healed quickly under simple dressing. A short time thereafter a pulsating tumor appeared at the seat of injury, which increased in size continuously until the date of admission. On admission a well-defined pulsating tumor was found at the seat of injury, of about the size of a hen's egg, which had a distinct thrill and bruit. The trunk of the temporal artery, together with the anterior and posterior branches, was involved directly in the growth. The trunk of the occipital artery of the same side was dilated, and its anastomotic communications with the branches of the temporal were dilated also. The patient was kept under observation for a few days to study the peculiarities the tumor might present, but inasmuch as its chief feature consisted in its rapid development, it was decided to tie the external carotid artery of the same side with a view to arrest the growth, if not to effect a cure.

On August 7, 1883, the vessel was tied in the presence of many of the visiting and resident staff of the hospital. It was exposed in the usual manner for about an inch above the point of bifurcation. The lingual branch arose about half an inch above that point, and it was tied at once with an independent catgut ligature. After this the trunk of the external carotid was tied with catgut at the origin of the already



ligatured lingual branch. The previous tying of the lingual had provided a branchless portion of the external carotid of about an inch in extent. The ascending pharyngeal branches were sought for, but were not found. Nothing unusual was noticed during the operation, except that the internal jugular vein overlapped the external carotid at the seat of ligaturing. The ligaturing of the external carotid checked the pulsation and all other aneurismal manifestations of the growth at once, also reduced its size to about one-third of the previous dimensions.

The operation was done antiseptically throughout, and the wound had healed entirely at the end of ten days, when the first dressing was removed. At this time a slight returning pulsation could be detected in the tumor, which, however, could be controlled completely by pressure on the external carotid of the right side. On August 30, the pulsations had increased, and the thrill and bruit were again noticeable. On September 8, the pulsation, the thrill, and bruit were nearly as strong as before the operation, but they could be controlled readily by pressure made on the occipital and temporal branches of the external carotid of the right side. The temporal branch only of the external carotid of the left side gave any evidence of a return of the circulation. It then became a question of tying the external carotid of the right side, or of tying its temporal and occipital branches alone, or to attack the growth itself directly. The latter plan was chosen, and was carried into effect September 26, only about seven weeks after the primary operation.

I trust that I may be excused if I digress somewhat at this time to describe the details of the method that was adopted for the radical cure of this case. The head was surrounded by two strong rubber bands, beneath which compresses were placed at the points where arteries passed to supply the scalp. By this means the arterial circulation of the scalp was controlled admirably. The growth was then nearly circumscribed just outside of its limits by a U-shaped incision, made through the healthy tissue of the scalp, down to the bone. The stem of the flap was made about an inch and a half in width, and it extended down to the zygoma, and the centre of its long axis corresponded to the course of the temporal artery. The loss of blood was not severe, since a bleeding point could be readily controlled by pressing the vessel against the underlying skull, while its open extremity was being secured. The bleeding points were closed by catgut applied directly to them when possible. If this could not be accomplished, they were closed by the overhand continuous suture of the catgut carried around and through the borders of the divided tissues. The flap and the surface from which it had been raised were kept separated



with antiseptic gauze until granulation took place; then they were fastened in apposition by adhesive straps. They united quickly, and a permanent cure resulted one month after the operation.

The following interesting practical facts are presented by this case:

1. The ligaturing of the external carotid of one side had but a temporary effect on a vascular growth that involved the branches of the ligatured vessel.

2. Pressure on the branches of the opposite external carotid artery interrupted the characteristic aneurismal manifestations that were present in the growth at its recurrence.

3. The ligaturing of all the vessels that passed to the growth, except the one of the pedicle of the flap, followed by independent granulation of the surfaces and their subsequent union, resulted in a rapid and complete cure.

I find eight additional cases of ligature of the external carotid for the cure of aneurismal tumors of the head, face, and parotid gland, in two of which both vessels were tied simultaneously. The latter procedure is not reported to have been successful in either instance. Traumatic aneurism of the parotid gland, varicose aneurism of the ear (two cases) are reported to have been cured by ligaturing the external carotid of the diseased side. It appears, however, that the last two cases received other and decided local treatment, which might have had quite as much to do with the cure as the ligaturing of the external carotid. This fact is emphasized by the recollection of the unsuccessful cases just mentioned of a practically similar nature, in which ligature of both external carotids alone failed to effect a cure. Of a total of nine cases, but one, traumatic aneurism of the parotid, was cured by ligature alone. These facts force the conclusion that ligaturing of the external carotid of the diseased side, and even of both external carotids, can be considered only as palliative, and cannot be recommended as a means of cure for vascular growths of the head and face, except in connection with other measures.

I do not think it to be a justifiable step to ligature the common carotid alone, nor in connection with ligature of the external or internal carotid for cases like the preceding, since the

rate of mortality for ligature of the common carotid is 40 per cent., while that for ligature of the external carotid is 3.62 per cent. This opinion is expressed notwithstanding the fact that the rate of cure for non-orbital anastomotic aneurismal formations is reported by Dr. Wyeth at 28 $\frac{1}{2}$  per cent., from ligature of the external carotid. It seems to me from these facts that some errors must exist in the primary reports of these cases, since the reverse of these figures would be more consonant with the anatomical bearings of the collateral circulation of the two operations.

Ligature of the common carotid should not be entertained except when from the contiguity of the morbid process the application of a ligature to the external carotid becomes impossible, or when ligature of the external carotid has failed to afford its possible relief, a contingency that is to be anticipated only when the morbid growth is developed at the location of a free anastomosis of the branches of the external carotid and the intracranial circulation, as in intraorbital formations especially.

The second authentic ligaturing of the external carotid, as a preparatory measure, was practised by John Lizars in 1830. It was done to lessen the hemorrhage attendant on removal of the superior maxilla. Preparatory ligature of the external carotid for removal of the superior maxilla, is not necessary for the safety of the patient, except in such cases as, when the patient is ill able to withstand the loss of blood that ordinarily attends this procedure; or to bear the loss that may arise from the removal of the morbid growth that prompted the operation. I am certain, however, that ligature of both external carotids and their ascending pharyngeal branches prior to the removal of large vascular growths involving the superior maxilla and the pharynx, or retro-pharyngeal growths of a similar nature, requiring the preliminary removal of the superior maxilla, should be earnestly commended to the profession. If the growth be of a malignant nature, this plan will not only lessen the hemorrhage attendant on its removal, but may likewise delay the return by lessening the activity of the nutritive processes at its site.

The third case of preparatory ligature of this vessel was

performed by Dr. Valentine Mott, about the year 1831, for extirpation of the parotid gland. The swelling of the soft parts contiguous to the diseased gland, complicated the operation somewhat; still, the patient suffered no ill effects from it, but died in less than two months thereafter from a return of the disease.

The rate of mortality of ligation of the common carotid for reputed malignant disease of the parotid gland, antrum, and face (not of orbit), is, according to conclusions of Dr. Wyeth, 44 per cent. from the operation alone, with 15 per cent. of cures resulting therefrom. I have collected nineteen instances of ligature of the external carotid for so-called malignant growths located in practically similar situations, with the loss of but one patient, who died of hemorrhage caused by sloughing of the growth. This case will be fully reported in the course of this paper.

Twenty-six per cent. of these so-called malignant growths are reported as "cured" by ligature of the common carotid. This seems inconsistent in view of the nature of the disease, a fact that was appreciated by Dr. Wyeth when he collected them. It is fair to assume, however, that if ligature of the common carotid will cure malignant disease of the face, ligature of the external carotid should lead also to a similar result. If the idea be to starve a growth, then truly, from anatomical reasons alone, ligature of the external carotid is the far more rational measure; because if the external carotid be ligatured, but comparatively little blood can reach the diseased part except by way of the opposite external carotid, provided there be no unusual anastomosis of the ligatured vessel. If the common carotid be tied for disease associated with the branches of the external carotid of the same side, then blood can reach the diseased part, not only through the opposite external carotid, but also by way of the circle of Willis, and the pervious internal trunk of the ligatured vessel.

With a full knowledge of these anatomical facts, and with the great difference in the death-rate of the respective operations, I fail to find an excuse even for ligaturing the common carotid for disease of the region supplied by the branches of the external carotid, except when ligature of the latter vessel is impracticable.

I will now present for consideration the history of two cases of my own, in each of which the external carotids were tied simultaneously for malignant disease involving the inferior maxilla, the floor of the mouth, and more or less of the tongue. In each of these cases repeated operations had been performed for the removal of the disease. A rapid recurrence had taken place in each instance, until the direct application of the knife seemed no longer feasible. The starvation plan appeared to be then the only one to offer any chance for delay to the course of the growth, combined with the greatest degree of comfort for the patients.

Recalling the fact that in the aneurismal growth, upon which I had previously operated, the collateral circulation from the opposite external carotid had reëstablished the circulation of the ligatured side within two months, and believing that it would likewise exercise the same influence in a similar operation for malignant disease, it was determined to tie both external carotids simultaneously, which was done in the first case on February 2, 1885. The incisions for ligaturing were made in the usual situations, and the enlarged lymphatic glands that were found in their course were removed. When the carotids were reached, most unusual anomalies were found. The right common carotid bifurcated beneath the posterior belly of the digastric muscle, which was divided to admit of the more easy application of the ligature. On the left side the bifurcation was located behind the hypoglossal nerve, which was drawn down and then the ligature was applied just below the posterior belly of the digastric. On the right side the superior thyroid branch was thought to be seen to arise from its usual position. No branches were found above the point of bifurcation for the distance of one inch, and a catgut ligature was applied at the middle of this space. The lingual and facial branches were not seen on the right side, a fact that caused no apprehension, for I had been informed that the facial had been tied some months before, during the removal of the diseased submaxillary gland of that side. I thought also that the lingual might have been associated with the facial since this arrangement exists in about 25% of dissections. On the left side the branches of the external carotid were normally arranged. The lingual was ligatured at its origin, and the trunk of the external carotid was ligatured just below this.

No annoyance took place during the operation other than that due

to the slipping off of a catgut ligature from the proximal extremity of the purposely divided facial vein, that had covered the artery in the line of the operation. The operation was done antiseptically throughout. The malignant growth diminished in size rapidly; the pain ceased; the discharge became scanty, thin and watery, and the ability to speak and to swallow improved rapidly. On the fifth day a portion of the tumor on the right side, corresponding to the former site of the submaxillary gland, sloughed out, leaving an opening an inch in diameter, bounded by sloughing tissue, at the bottom which could be seen necrosed bone of the lower jaw. It had been ordered that the patient be constantly watched from a fear that hæmorrhage might occur. On the night of the 11th, nine days after the operation, the patient was discovered deluged with blood, and he died from its loss before morning, in spite of every possible effort of Dr. Pinkerton, the house surgeon. Even transfusion with saline solution was employed.

It was found that the hæmorrhage had taken place from the site of the slough before mentioned. An abnormality of the circulation was suspected at once, and the suspicion was confirmed subsequently by a careful dissection. The facial and lingual branches of the right side arose from a common trunk at the bifurcation. The fatal hæmorrhage had been caused by sloughing of some of the starved diseased tissue, into which the stump of the abnormal facial artery had passed. The vessels on the left side were not uncommon in their arrangement. The operation-wounds themselves presented no appearances of an unusual character.

It is seen at once that this case presents very rare anomalies of the circulation. It is very rare indeed that the common carotid arteries do not bifurcate at or between the upper border of the thyroid cartilage and the greater cornu of the hyoid bone. I can find no record of the lingual or facial ever having arisen from a similar point, as in the above case. Dr. Wyeth, in his report of 121 consecutive dissections of the external carotid and its branches, found but four instances in which the lingual branch was given off at a fourth of an inch above the bifurcation, and in only one of these did it arise independently of the facial branch. In one instance it arose an eighth of an inch above the bifurcation by an independent origin. The average origin of the lingual in 121 cases was 0.68+ inch above the bifurcation. In these same dissections the facial arose at



an average of 0.92+ inch above the point of bifurcation. In no instance did it arise independently within less than a fourth of an inch from this point. In one instance only the lingual and facial arose by a common trunk an eighth of an inch from the bifurcation. I have no doubt that if I had tied the branch at the bifurcation which I had supposed to be the superior thyroid, but which was, in fact, the common trunk of the facial and lingual, the patient would not have died from hæmorrhage.

The result of this case emphasizes some important facts, viz :

1. The tying of the external carotids robbed the growth of so much of its vitality that, notwithstanding it was presumably supplied in part by the lingual of the right side, and also by branches of the pervious stump of the facial of the same side, the diseased tissue sloughed and involved thereby the stump of the facial itself.

2. The branches at the bifurcation should be tied when it appears that neither the lingual nor the facial arise from the first inch and a half of the external carotid.

3. The feasibility of simultaneous ligature of both external carotids for the starvation of malignant growths of the regions supplied by their branches, is emphasized by the effects on the growth in this case.

The number of deaths from ligature of the external carotid alone that may be justly attributed to the operation itself, is somewhat indefinite. Dr. Wyeth reports 67 cases of ligaturing, with two deaths occurring after the operation ; but, inasmuch as these two patients were still suffering at the time of their death from the gunshot wounds for which the operation had been performed, it is certainly not proper to charge these deaths to the operation alone. I am able to add to this list 16 others, and in but one of these (my own) did the subsequent death of any bear the least relation whatever to the operation itself.

The amount of objection that may be raised to ligature of the external carotid by reason of the death just reported—a death clearly dependent on abnormalities of the circulation not before described—is a matter that I will leave to others



than myself to express. Hæmorrhage at the seat of the operation has never as yet proved fatal, and it has, as a rule, been controlled easily by simple means, as pressure, styptics; etc. In a number of instances hæmorrhage has taken place at the seat of the injury or of the disease, for the relief of which the vessel was tied, and it has required ligaturing of the common or internal carotid of the same side to control it. But in no instance can I find that the opposite external carotid has been tied with the same view.

The second case was performed in Bellevue Hospital May 10, 1885. It pursued subsequently in all important respects, a similar course to the first, except that no hæmorrhage or sloughing occurred. The patient was discharged from the hospital in one month, much improved, with instructions to report at intervals of a week. He reported at the hospital as requested for the next two months. During this time the growth showed but a little tendency to increase in size. The pain and difficulty in swallowing did not return. However in the meantime he had developed a profound cancerous cachexia, attended with emaciation and loss of strength. No evidences of internal cancerous involvement were discovered. Finally he disappeared suddenly, and was not again heard from by myself, even though his recorded address was visited and a thorough inquiry was made to ascertain his whereabouts.

The main objections that are raised against ligaturing the external carotid are the following: (1) The difficulty of the operation; (2) the danger of secondary hæmorrhage at the seat of the ligature. It is no doubt true that ligature of the external carotid is not as easily accomplished as that of the common trunk, but this is no reason why it should not be practised in preference to the latter when the comparative results of the two are considered. The linear guides of the two vessels are equally simple. The primary incisions of both are alike uncomplicated, provided the region of the external carotid is not invaded by disease. The deep guides of the external are as plain and unvarying as can be wished. The digastric muscle and the hypoglossal nerve are constant in their relations to this vessel. The lingual vein, the facial vein, and its connections, are obstacles to ligaturing of the external

carotid; but, with care, they can be displaced, or they may be divided between two ligatures, and turned aside. The internal jugular vein sometimes encroaches alike on both vessels. The external carotid may be mistaken for the common, as for the internal carotid. The points of origin, size, and direction of the branches of the external should enable the distinction between it and the common trunk to be easily made. The difference in the origin, course and depth of the two vessels, to say nothing of their differences as to branches, should discriminate between the internal and external carotids. Finally, if a doubt exists after the ligature is passed, raise the vessel gently from its bed by means of the ligature, and study the effects of the ligature pressure on the branches of the external carotid, and on the trunk of the internal carotid.

Care should be taken not to pass the ligature around both vessels at the bifurcation. This is an error to which the relations and appearances of the vessels in this situation add but little that is reassuring. However, to state the liability of the error should be to signal the danger with sufficient acuteness to prevent its occurrence. It is proper to add in this connection that if ligature of the external carotid be associated with removal of the parotid gland, it should be ligatured as near to the gland as circumstances will permit.

In conclusion I respectfully submit the following propositions:

1. Ligature of the external carotid artery, together with independent ligature of the branches arising from the first inch of its course, is a safe and commendable operation.

2. When the facial and lingual arteries do not arise singly, or by a common trunk from the first inch of the course of the external carotid, the branches arising at the point of bifurcation of the common carotids should be tied.

3. Simultaneous ligature of both external carotids is a rational preparatory measure for operation involving the parts supplied by their branches when dangerous hæmorrhage is feared. If the pharynx be involved, the ascending pharyngeal branches should be ligatured also.

4. Simultaneous ligature is advisable as a final expedient to diminish the rapidity of the development of extensive malignant

growths when they are nourished by the branches of the external carotids.

5. Ligature of one or both of the external carotids for the cure of aneurismal formations of the branches of the same is not feasible as an independent curative measure.

6. Ligature of the common carotid should not be done for the cure or for the arrest of morbid conditions involving the external carotid or its branches, except as a final resort.

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## REPORT OF OPERATION FOR REMOVAL OF COLOSSAL CYSTIC TUMOR OF LOWER JAW.

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AS long ago as 1871, before I even contemplated making medicine my profession, I recall the visits of Henry Macklin, to my father's office, and, that there I saw my father open a cyst about the center of the alveolar process of the lower jaw, and at intervals of several days, inject the cavity with tr. iodine. Macklin continued under treatment several months, but declined to allow any operation further than that named above. The cyst at time of first opening contained a mucilaginous fluid to the amount of about half an ounce. It seems that he sought no further advice concerning the growth, until about the first of February, 1886, when he called on me. The accompanying cut gives his appearance. His age is forty years; has resided in Memphis for twenty odd years; general health always good; occupation, teamster. Within the past six or eight months has lost flesh, owing to inability to take sufficient nourishment. Diet: Liquids and finely-cut meats. Teeth of lower jaw nearly all out, and the remaining few so diverged from the normal line that they cannot touch the upper teeth, and in fact, no effort at mastication can be made,

owing to size of lower jaw. The growth is clearly of cystic nature—elastic and even, fluctuating points easily detected, with bony masses between; crackling sensation felt on manipulation. The tumor, after nearly filling the buccal cavity, grew forward and outward; grew out of the mouth, the under lip being pressed down, and scantily covering the lower surface of the mass, which occupied the entire body of the bone, from angle to angle. A few straggling teeth peeped up here and there; the mucous membrane thinned and ulcerating at many points, gave a very bad odor to the tumor. There was no glandular enlargement; articulation very indistinct. The growth of tumor had been gradual and painless. Circumference from chin to lambdo-parietal junction was 42 inches. Several cysts on upper aspect were punctured, emitting white-of-egg-like fluids. The diagnosis was in accordance, cystic disease of lower jaw. Operative interference was clearly justifiable, and the patient anxious for the step.

On February 26, 1886, assisted by Drs. D. D. Saunders, S. A. Rogers, Ashe, Dorey, Haywood and Graves, I operated. With the patient fully anesthetized, and lying on the left side, I first passed a stout ligature through tip of the tongue, to secure it against falling back and choking him, when the genial muscles were severed. An incision was then made along the anterior aspect from side to side, at the line of junction of the labial mucous membrane, with that covering the tumor. This incision was  $8\frac{1}{2}$  inches in length, and freed the lower lip, which was then carried down and backwards, and the tumor "delivered," so to speak. Keeping the knife well against the bone, I detached the masseter muscle on each side, and with Hey's saw cut through the rami. The right ramus was in fair condition of soundness, but the left was cystic nearly half way up. The next step was to sever the attachments of the int. pterygoid, mylo-hyoid, digastric and genial muscles, during which great pains were taken to keep the edge of the knife against the bone. The tumor being fully separated and removed, I found the sublingual artery alone requiring ligation; quite a number of veins poured forth their contents, but on the whole not more than six ounces of blood escaped. The tongue showed a marked tendency to fall back and choke the patient, but was under ready control by means of the ligature in its apex. The points on the rami were rounded with forceps; the buccal cavity thoroughly cleansed with carbolized solution; a broad bandage was carried sling-

like around the head, to support the super-abundance of lower lip; an attendant placed in charge of the cord holding the tongue, and the patient put to bed. The pulse gave no evidence of depression; he soon came from under the anæsthetic, and three hours later I found him in excellent condition.

Time occupied in the operation was forty minutes, including time of administering ether.



FIG 1. CYSTIC TUMOR OF LOWER JAW.

The temperature reached  $100^{\circ}$  on the second day after the operation, but subsided of its own accord on the third day. His food consisting of milk and broth, was taken through a tube. For the first two days a constant watch was necessary to prevent the tongue falling back and choking him, but from the third day on he was able to control this tendency of the tongue, and the cord was removed.

The fourth day found him improving and propped up in bed; the discharge was not abundant nor offensive. Antiseptic washes were used every two or three hours, and he continued to do well until the

seventh day after the operation, when it was with much persuasion I kept him from getting up and dressing himself. The wound was contracting and healing nicely, its edges healthy; the pus was "laudable."

On the fifth day he was able to sit up, and was feeling quite himself, as he expressed it. I did not see him that day, but learned late that night he had a little fever. I ordered quinine to be taken during the night, but it was not retained; called at 9 o'clock the next morning; he had just had a chill—nose and ears still cool—pulse feeble. I ordered stimulants and warm applications. At 11 o'clock his temperature was  $104^{\circ}$ ; pupils dilated; breathing, labored; patient stupid; at 12 o'clock he died. His death was due to congestion, such as is not unfrequently seen to follow a chill in this climate. Upon questioning his wife, I learned that two weeks prior to his death he had a chill, but took quinine, which kept off the next paroxysm.

The tumor is now in the museum of the Memphis Hospital Medical College, weighs  $7\frac{1}{4}$  pounds; transverse diameter,  $9\frac{1}{2}$  inches; ante.-post. thickness in median line,  $7\frac{3}{4}$  inches; depth at median line,  $7\frac{3}{4}$  inches.

A section of the mass shows it to be made up of cavities separated by bony walls, lined by serous membrane; these cavities vary from one-fourth inch to one and one-half inch in diameter; contents vary from white-of-egg, straw, brown to sanguineous color. The make-up of this tumor is most accurately given by Gross, under the head of "Cysts of Lower Jaw, belonging to what might be termed compound cysts.



## EDITORIAL ARTICLES.

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### MACCORMAC ON ABDOMINAL SECTION FOR THE TREATMENT OF INTRA-PERITONEAL INJURY.<sup>1</sup>

Sir Wm. MacCormac, whose personal experience of military surgery in the great Franco-Prussian war of 1870, whose sound and detailed knowledge of antiseptic practice, and whose recent brilliant successes in two cases of intra-peritoneal rupture of the urinary bladder, mark him out as peculiarly well qualified to deal with the subject, has recently delivered an oration before the Medical Society of London, with the title at the head of this article.

In his introductory observation he quotes the words of Helmholtz that "medicine indeed has become young again, and endowed with fresh and greatly enhanced powers of doing good by dipping in the youth-springs of the natural sciences." He then goes on to pay to Lister that tribute which no true apostle of modern surgery withholds from the man who has shown us the key to it.

After mentioning that Mr. Walsham has recently had a successful case of suture of an intra-peritoneal rent in the urinary bladder, Sir Wm. MacCormac describes a case of suture of the intestine by his colleague, Mr. Croft.

A man, æt. 34, jumped upon in a public house row; great pain; sickness. Hospital after seventeen hours. Operation in eighteen and a half hours. Temperature previously 103°. Median laparotomy. Ileum discovered ruptured transversely in two-thirds of its circumference. Lacerations of mesentery and omentum. Fæcal extravasation. Septic peritonitis. Irrigation with warm 15 to 20% solution of boracic acid. Edges of intestinal rupture sutured to margin of parietal wound. Operation lasted one and a half hours. Collapsed state. Ultimate

<sup>1</sup>Oration before the Medical Society of London, May 2, 1887, published in the *British Medical Journal*, May 7 and 14, 1887.

recovery, but no strength or flesh regained. "Irrepressible escape of intestinal contents at the artificial anus."

At end of a month a second operation. Bowel separated from abdominal parietes, and opening in it closed with Lembert's suture. Operation lasted two and a quarter hours. Death thirteen hours after operation. "The suturing had been perfect and the peritoneum was entirely free of any recent exudation or inflammatory products."

Another case is mentioned in which Mr. Mackellar, for a gunshot injury of the sigmoid flexure, recently opened the abdominal cavity, but found it impracticable to apply Lembert's suture to the intestinal perforations caused by the bullet. "The patient was in a state of impending collapse at the time of the operation, and died twelve hours afterwards."

Still a third recent case is given in which a young man never rallied after his ruptured spleen had been excised (by Mr. Croft).

Though MacCormac writes of these as cases in which "success was nearly achieved," less sanguine and more cynical persons may regard them as instances of "failure completely achieved," as regards the radical measures of enterorrhaphy and splenectomy.

The first two cases, indeed, seem at first sight to lend countenance to John Bell's strong words concerning Benjamin Bell's recommendation of suture of wounded intestine. This is quoted (later on in the oration) by MacCormac, and runs as follows: "I have ventured to say that if there be in all surgery a work of supererogation it is this operation of sewing up a wounded gut. It is a dangerous and puerile conceit."

But reflection and a careful study of the facts put forward by our author point to a different conclusion. So minute a percentage of cases of wounded intestine recover when left to nature that such treatment or want of it offers practically no hope. And though the cases operated on die, it seems almost always, on reading their history, that the operation is done too late. Perhaps this argument scarcely applies to Mr. Croft's first case, in which the enterorrhaphy was performed at the surgeon's leisure one month after the accident, but it does apply to his second which was not brought to the hospital until twelve hours after the spleen had been ruptured.

The history of the subject is touched upon, and St. Croix, of Pennsylvania; Benjamin Travers, Jobert, Lembert, Gely, Amussat, Gross, Parkes, of Chicago, Senn, of Milwaukee, Dennis, of New York, and other operators, experimenters and writers are duly referred to. The great rarity of penetrating wound of the abdomen without injury to the viscera is emphasized and various facts given in proof. "Larrey in his long career only observed one instance in which a ball penetrated the abdominal cavity without producing immediately serious results, and in this case the intestine was afterwards found to have been contused."

The most fatal complication of penetrating wounds of the abdomen is injury to the small intestine. Sword and bayonet wounds of the bowels are rarely met with even in time of war, but knife and dagger wounds are common in time of peace, especially it might be added, in certain localities. Their diagnosis is of prime importance, and, in the early stage, often a mere matter of conjecture. Tympanites, discharge of blood *per anum*, are valuable symptoms when present, but neither may appear directly after the injury. If the blood passed from the bowel be abundant, and show itself soon after the injury, it is a very valuable symptom. Emphysema, when it occurs in the wound-neighborhood, is said to be pathognomonic. Shock and pain vary so much in degree as to afford no useful guidance.

With regard to the advisability of probing, if precautions be taken to exclude septic influences, the thorough examination of the wound by the probe may determine its direction and extent, and if this fails to clearly establish the fact or otherwise of penetration, the wound should be enlarged and explored to its termination either in the parietes or more deeply. The important point to speedily determine is, whether the wound penetrates the abdominal cavity, and this is perhaps the most effective manner of ascertaining it.

To wait for peritonitis, etc. to confirm the diagnosis is a fatal mistake.

With regard to *treatment*, the choice lies between enterorrhaphy and the formation of an artificial anus by suturing the margins of the wound in the bowel to the skin. The latter course should always be avoided

when possible. It is in the highest degree undesirable, and certainly unnecessary in those cases where the injury does not extend more than half-way around the calibre of the tube, or where the convexity of the bowel is wounded and probably in all cases where the mesenteric attachment is intact; and the same may be said where the bowel is ruptured by external violence. This practice gives the surgeon a false sense of security; he thinks if his sutures give way the patient may still recover, but the evidence is very strong that the risk of fæcal extravasation is less when the wound in the bowel is completely closed, and the gut at once returned to the abdominal cavity. The indications in these cases are not identical with those in strangulated hernia with gangrenous bowel.

Other objections to forming an artificial anus in cases of wounded intestine are, (1) that even if the operation succeed, the surgeon's work will be only half done, and the artificial anus have to be closed at a future time by a separate operation; (2) should the original injury be done to the upper part of the small intestine the patient may be starved or fatally weakened by the escape of nutriment.

Under the heading "*Methods of Suture*," three conditions are laid down as required to ensure successful suture of the intestine.

1. Two adequately broad and sufficiently wide surfaces of the peritoneum must be brought into contact.
2. The mucous membrane must be excluded, for when the needle passes through the whole thickness of the gut, peritonitis generally ensues from leakage along the line of the thread.
3. Rapidity of execution is of extreme importance, and that form of suture is the best which can be effectively applied in the shortest time.

Lembert's suture is recommended, and the operator is warned not to draw the sutures too tightly lest he cause gangrene and consequent failure to procure union. Experimentally this has been found to be the most frequent cause of non-union.

For perfectly cleansing the abdominal cavity of all blood and foreign matter, MacCormac recommends, as the best and gentlest method, irrigation with a 3% solution of boracic acid, at a temperature of 100°, made with water previously boiled.

When the operation has been done shortly after an accident, the drainage tube may be dispensed with.

GUNSHOT WOUNDS. These we are told are "far from being rare in civil practice, especially in America, where everyone carries a revolver and often uses it on small provocation" (sic). As the expression "every one" includes my friend Dr. Pilcher and all his able compatriots who assist him in the preparation and production of this journal, the state of American manners and customs revealed by Sir William's sentence just quoted is to me a matter serious and alarming. I sincerely hope they will not "often use their revolvers" on one another, or I may soon be left alone to manage this journal and to invite invidious comparisons with the time before my esteemed co-editor perished in what I now suppose to be the usual American mode of ending. So long, however, as Dr. William T. Bull is numbered among my American colleagues, I shall feel comparatively comfortable. As my conscience tells me that I have given Dr. Pilcher various "small provocations" from time to time (this digression is one of them) it is pleasant to reflect that the most modern of revolvers do not carry across the Atlantic.

Important practical points touched upon are that it is rare for more than two convolutions to be wounded by the same bullet or for the intestine to be wounded in more than four places, that it is also rare for fæces to appear in the external wound, that the mucous membrane seldom or never blocks the perforation produced by the smallest bullet, to an extent sufficient to prevent extravasation, and that the occurrence of bloody stools is usually a late symptom, without practical importance in reference to operation.

"Air in the abdominal cavity causing tympanites, emphysema around the wound, a larger escape of blood than the injury to the parietes will account for, are among the symptoms which will help to indicate intestinal injury."

Hæmorrhage tends to be severe after gun-shot wounds of the abdomen, even when only small vessels are injured. The admission of air by abdominal section has a salutary effect in tending to check this bleeding. Hæmorrhage is the most frequent cause of death after gun-shot wound of the abdomen. In Parke's experiments no shock

was noticed apart from that which was apparently due to loss of blood. The mere passage of the bullet did not affect even the pulse or the respiration.

A brief historical notice is appended.

*Treatment* of gunshot perforation of the intestine. An exploratory abdominal section is strongly recommended, and that as soon as possible after the infliction of the injury, and performed with every anti-septic precaution. When it has been delayed, the condition of shock is so much aggravated by the necessarily prolonged operation that it may be impossible to complete the thorough disinfection of the cavity.

No hand but the operator's should ever be allowed to enter the abdominal cavity. The entire intestinal tract as well as the stomach and other viscera should be examined. Otherwise the operation is incomplete. "The intestines must be withdrawn, carefully examined, and protected as far as possible by warm cloths. The best way is to seek the cæcum first, and then trace the small intestine upwards for its entire length; in this way we shall be least likely to fail to find the injury."

When several openings exist close together, resection of the portion involved is recommended. The fingers are considered to be better than the ingenious clamps which have been invented. When a large piece of intestine requires removal, a triangular piece of mesentery may have to be excised.

The mucous coat becomes much everted, sometimes seriously interfering with the work of suturing. It should not be excised, as it gives support and supplies blood to the edges of the gut. In all the experiments where it was cut off by the scissors, the sutures gave way (Parkes).

"There is a triangular interval, filled with connective tissue and bloodvessels between the layers of the peritoneal coat as it leaves the bowel to form the mesentery. At this place the needle must be passed deeply enough to include the muscular coat as well as the serous, otherwise extravasation will result."

The following order of insertion is recommended: First, three su-



tures at the mesenteric border in the manner insisted upon by Parkes. Secondly, a suture at the convexity of the bowel. Thirdly, one half-way down on each side. Then the others following in order in the quadrantal intervals between. In cases of complete resection of the bowel, it is best to include a considerable width of serous membrane. Each suture should be introduced not less than a third of an inch from the divided margins, brought out just free of the edge on one side, then re-introduced close to the opposite edge and made to include about the same width of tissue. It should include only the serous and muscular layers. Fine silk and a moderately curved needle are recommended. Czerny's double row is condemned as tedious and superfluous.

ABDOMINAL INJURY WITHOUT EXTERNAL WOUND. RUPTURE OF THE INTESTINE. Several cases are quoted to illustrate the fact that the most serious injury is sometimes unaccompanied by any definite diagnostic symptoms. Nevertheless the fatality of concealed lesion of the intestine is so great that since the beginning of this century the idea of intervention has occurred to many surgeons, and in seven or eight cases it has been put in practice, but unfortunately with a fatal result in every instance.

*Symptoms and indications for operation.* Profound shock, with persistent and intense pain, increased on pressure.

The jejunum and ileum are the portions of intestine most frequently ruptured, and the rent will generally be found just behind the part of the abdomen which has been struck.

*Treatment.* Chavasse, from a collection of 150 cases, estimates the mortality at 96 per cent., which MacCormac thinks below the mark. He recommends exploratory laparotomy when there are reasonable grounds for believing that the intestine has been damaged. The incision should always be in the middle line and should be large enough to permit the whole abdomen to be explored through it.

Much of the concluding part of the address, though not referring solely to peritoneal injuries, deserves quoting *in extenso*.

"The French troops in the Crimea lost one in every three. Of 95,615 Frenchmen who lost their lives there, only 10,240 perished at the hands of the enemy, as many more died in hospital from the effects of

their wounds, so that the remainder, amounting to 75,000 men or more, were sacrificed to diseases for the most part preventable.

During the American war 97,000 men died from wounds, while just double the number, 184,000, perished from diseases which modern knowledge declares to be mainly preventable. What a sea of blood and tears, what want of provision and due care for the health of such great numbers of men massed together, do such figures suggest!

During the Franco-German war the losses on the German side in killed and wounded exceeded, for the first time in military history, those sacrificed by disease; it was, in fact, more than double in amount, for while 17,572 received death at the hands of the enemy, and 10,710 succumbed from the effects of their injuries, the number of those who died from disease was only 12,253.

In all the older campaigns blood-poisoning caused the most fatal consequences to the wounded. In the American war the number who died from this cause was enormous. \* \* \* At Sedan, among the French troops, pyæmia was the uniform cause of death after operation, in gun-shot fracture, and in many cases of simple flesh-wound."

"We now possess means of checking this horrible malady, and in the campaign in Egypt in 1882 our surgeons were furnished with the best antiseptic appliances, and the material in their hands was turned to such excellent account that not a single man died from pyæmia, septicæmia, erysipelas, or hospital gangrene—a result altogether unparalleled in the annals of war."

Valuable tables of cases are appended.

C. B. KEETLEY.

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#### ON CONTAGION THROUGH THE USE OF ETHER INHALERS SUGGESTIONS FOR ITS PREVENTION.

At the West London Medico-Chirurgical Society on May 6, Mr. Richard W. Lloyd, anæsthetist to the West London Hospital, made some very important observations on the administration of anæsthetics by breathing in and out of a rubber bag; for example, take that of "Clover's inhaler."

Who amongst us has such contempt for the infectious theory of the origin of certain diseases that he would cheerfully and readily inhale

out of a bag which has just been held for a couple of hours over the mouth of a sufferer from advanced phthisis, or diphtheria, or scarlatina.

It is true that these appliances can be thoroughly cleansed and disinfected after each time of use. But are they? They certainly are not. I have seen anæsthetics administered in many hospitals, and I cannot recollect a single instance in which the administrator gave more than a mere nominal cleansing to his apparatus. I have had to ask the anæsthetist to give chloroform instead of ether, because he was about to use a bag which he had only five minutes before taken off the mouth of a patient with tuberculous lungs. Such an occurrence would perhaps be less likely in America where, I believe, it is not the custom to use india rubber bags and complicated mouth-pieces for ether administration; but everywhere such are required for nitrous oxide.

It is possible also that the ether vapour itself may be a sufficient antiseptic; but has it always time to act?

Then, moreover, there is the sentimental aspect of the subject. It is surely more repulsive for a number of people in succession to breathe in and out of the same bag than to use the same pocket-handkerchief or wear the same shirt.

By far the most ingenious invention to obviate the difficulties under discussion, indeed the only one yet presented to the profession (as far as I know) has just been brought out by Mr. Richard Lloyd. He has the inhaling bags made so thin that the value of the india rubber and the cost of manufacture amount to a mere trifle. *It thus becomes practicable for each patient to have an entirely new bag.* These bags are made by a process of blowing out while warm, just in the same way as those spherical films of india rubber which children buy in the toy shops and of itinerant sellers.

The mouth-piece has to be cleansed with soap and carbolic acid. To it a brush can be used. Messrs. Maw, Son & Thompson, of Aldersgate street, London sell the bags by the dozen or by the gross.

I think there are few people who will not be ready to acknowledge that Mr. Richard Lloyd has hit upon an exceedingly happy idea.

C. B. KEETLEY.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

I. On a Revision of the Teachings Regarding Major Operations (Amputations) for Diabetic Gangrene. By Prof. KONIG (Göttingen). The principles governing the practice of German surgeons in such cases may be summarized as follows: In diabetics there is a greater disposition to inflammatory and necrotic inflammatory processes than in the healthy. These processes originate and spread by microbes just as in other cases, only that here these organisms doubtless find a more favorable material and the tissues more readily become necrotic. By French surgeons and by Roser it has been pointed out that necrotic processes occur more frequently even in diabetics still apparently strong and without thirst or polyuria. In all cases where spontaneous or even post-traumatic phlegmonous and gangrenous processes develop, the urine should be examined for sugar. This rule does not overlook the later recognized fact (Redard, 1886) that in such conditions sugar and albumin may be present transiently. According to Roser inflammation and necrosis in diabetics must first be treated constitutionally. The question of such larger operations on diabetics, as amputation for gangrene is a difficult one for the surgeon. The general plan has been to avoid them as long as symptoms of diabetes continue. General antidiabetic and local antiseptic treatment suffices in some, but in severe cases the trouble often ends fatally. In such a case last year K. concluded to risk amputation and saved a gouty old man (of 70 years) with gangrene of the leg. This began at the little toe and, extending to the ankle, led to suppuration, increase of sugar in urine (from 2 to 4%), loss of appetite and flesh, coma, etc.

As the patient was in an exhausted condition constriction was employed. Rapid amputation at middle of leg. Very extensive arterio

sclerosis with calcification of numerous small arteries was found. By the next day sugar had disappeared from the urine and the apathetic condition had passed off. The wound remained aseptic; appetite returned. Diet was continued and the patient was discharged in eight weeks with no sugar in his urine. Later, however, despite antidiabetic regimen, sugar was again found in the urine.

A second case was that of a well nourished brewer æt. 40, Phlebitis of left leg two years previously. Thirst and loss of flesh for nine months. Gradual development of gangrene of left big toe, with consequent phlegmons of the foot. Loss of appetite, continuous hic-cough, low fever. The urine contained 4% sugar and a trace of albumin. Despite careful general local treatment the patient grew worse, although the sugar diminished to  $2\frac{1}{5}\%$ .

Operation as in the previous case. In four days the sugar had disappeared from the urine, and other morbid symptoms were no longer present. Discharged cured in six weeks. Here also the same arterial changes were found as before. Six months later the urine contained no sugar.

He concludes from these cases that in diabetic gangrene where, despite antidiabetic and local antiseptic treatment, the general and local symptoms do not improve and further waiting involves danger to the patient, we should try to save life by a radical operation—usually an amputation—executed with the most scrupulous attention to antisepsis.—*Centbl. f. Chirg.* 1887. No. 13.

WM. BROWNING (Brooklyn).

**II. Treatment of Erysipelas by Ichthyol.** Von Nussbaum states that erysipelas may be healed quickly and without pain by the use of ichthyol. The wound attacked by erysipelas was disinfected and covered closely with iodoform gauze. The erysipelatous surface, while still spreading, was painted with ointment made of equal proportions of ichthyol and vaseline. The part thus painted was covered with 10% salicylic lint, and fixed with a gauze bandage. Next day the border was found to have remained stationary, while the inflamed surface was shrunken into yellowish-brown creases, and was painless. After three days the dressing was discontinued, as it began to

affect the skin. Five consecutive cases gave equally successful results. Ichthyol collodion is recommended for applications to the face, and ichthyol soap for the scalp. Von Nussbaum considers ichthyol a reducing agent, *i. e.*, as acting on the cocci by making the soil where they multiply unfit for their nutrition. He does not regard it as an antiseptic, though it is so considered by some surgeons.—*Med. Press of Western New York*.

**III. The Influence of Chronic Bright's Disease on the Safety of Anæsthetics.** By WESLEY M. CARPENTER, M.D., (New York). Referring to the fact that freedom from heart disease is a necessary preliminary to the administration of ether, and that examination of this viscus uniformly precedes anæsthesia, attention is called to a much neglected cause of fatal results, especially after the administration of sulphuric ether—chronic Bright's disease. After a brief review of the scanty literature of the subject, he relates two cases: (1) A middle-aged woman suffering from recto-vaginal fistula, in whose urine a small quantity of albumin had been found, had died upon the table just before the completion of an operation for the relief of her infirmity; autopsy revealed nothing to which death could be attributed in the other viscera, but the kidneys showed the lesions of chronic diffuse nephritis with evidence of an acute process. (2) A middle-aged powerfully built man had been operated upon under ether, recovering with no unfavorable symptoms; two weeks later he was again subjected to operation under ether and rallied completely from the anæsthetic, but died suddenly eight hours afterward; autopsy revealed mitral incompetency and fatty infiltration of the heart, with chronic diffuse nephritis together with renal changes due to an acute process.

He quotes the opinion of Emmet that certain deaths from uræmic poisoning might have been avoided had the urine been examined before the anæsthetic was given, and concludes: (1) Too great care cannot be exercised in examining the urine, both chemically and microscopically of all patients who are to undergo surgical operations. (2) Chronic Bright's disease diminishes the safety of anæsthetics, especially sulphuric ether, as well as the safety of the operation.—*N. Y. Med. Rec.* Feb. 6, 1886.



**IV. The Dangers of the Administration of Ether in Nephritis and in Bright's Disease.** By HENRY B. MILLARD, M.D., (New York). A case is related in which acute nephritis of the severest character, although not fatal, resulted from the administration of ether, even though the patient was not under its influence more than fifteen minutes, the patient being at the time of the operation—curetting of the uterus—affected with a mild degree of chronic catarrhal nephritis. The author believes ether to be productive, when administered in nephritis, of a double source of danger: (1). The production of paralysis of the renal nerves and their terminal filaments, leading to passive congestion or inflammation of the renal vessels, glomeruli, etc.; (2). The impossibility on the part of the kidneys of eliminating the ether, and its consequent retention in the system. He believes chloroform to be much safer in cases of nephritic trouble, although the volume of evidence is not yet sufficient to demonstrate it, and suggests cocaine locally as a substitute in many cases.—*N. Y. Med. Rec.* Jan. 29. 1887.

**V. The Selection of Chloroform or Ether as an Anæsthetic.** By ARPAD G. GERSTER, M. D. (New York). This paper is a protest against the indiscriminate use of ether and an appeal for more scientific methods in the selection and administration of an anæsthetic. I. It being admitted, however, that on the whole, ether is the less dangerous anæsthetic, preference should be given to it, especially when anæsthesia has to be conducted by an inexperienced person. But (1) ether should not be used as an anæsthetic in cases of present or even suspected acute or chronic nephritis; referring to the remarks of Emmet, Carpenter, Millard and others, the writer relates a case of operation for strangulated hernia in which the patient rallied well from the operation, but succumbed ten days later to acute nephritis consequent upon the anæsthesia, although there had been no indications of kidney trouble previous to the operation. The immunity with which chloroform has been used in cases of puerperal eclampsia, as well as in other renal troubles, justifies him in stating that a careful examination of the urine should carefully precede every anæsthesia, and the presence of albumen or casts should be considered a positive

contraindication to the use of ether, and a direct indication for the use of chloroform. (2). Chronic catarrhal affections of the bronchi of the aged and perhaps of infants frequently develop into catarrhal pneumonia terminating in the death of the usually enfeebled patients in question after anæsthesia from ether. The very profuse secretion and inspiration of saliva into the air passages seems to be the main cause of this pneumonia observed after the inhalation of ether; the cold fumes of the drug seem to blunt the sensibility of the bronchial mucous membrane to such an extent that the entrance and presence of even vomited matter does not excite a sufficient stimulus to vigorous reflex action or coughing, especially at the end of prolonged anæsthesia. Six cases are quoted in support of this thesis, in none of which the operation was performed upon the mouth or air passages, and in which consequently there could have been no complicating entrance of blood. (3). A change from ether to chloroform is justified and proper when complete relaxation and loss of sensation indispensable to the performance of an operation cannot be induced by the former agent, and where local anæsthesia by cocaine or ether spray is impracticable. In 11 out of 125 cases in the German Hospital in 1886, in spite of careful preparation of the patient and proper administration of ether by a competent and experienced physician, relaxation could not be produced; but a change of the anæsthetic was generally followed by the desired state of tolerance and relaxation. Four cases are detailed to sustain this point.

II. The contra-indications to the use of chloroform are of two kinds—extrinsic and intrinsic. (1). The former is the carelessness or incompetency of the anæsthetizer, which is undoubtedly graver with chloroform than with ether, but for which no help is to be looked for. (2). The only valid intrinsic objection to the use of chloroform is a weak heart from any cause, be it fatty degeneration, great anæmia or nervous influences. (a) The fluttering, compressible and irregular quality of the pulse, together with other clinical aspects of the case, will readily indicate the presence of fatty changes of the heart fibre—in which case even ether should be used with great caution—and (b) deep anæmia is readily diagnosed. (c) Functional heart weakness

produced by nervous influences of permanent or mostly passing character, such as excessive fear or fright, is in the estimation of the author, one of the most important contra-indications against the use of chloroform.—*N. Y. Med. Record*, April 23, 1887.

**VI. Tannic Acid as a Surgical Dressing.** By T. J. HUTTON, M. D. (Fergus Falls, Minnesota). Tannic acid forms an excellent dressing in three classes of wounds: (1). Incised wounds—applied after the sutures are inserted, or adhesive plaster is applied, if the wound does not require stitching. (2). Small wounds of irregular form and recent occurrence. (3). Wounds of moderate size in compound fractures. Wherever applicable, it excels all other dressings in the following respects: (*a*), convenience; (*b*), cheapness; (*c*), cleanliness; (*d*), efficiency. It is always ready and requires no mixing or measuring, and has neither smut nor smell. The author has used it with perfect satisfaction for sixteen years. The mode of application is simply to keep the wound covered with the powder. Healing under this dressing requires about one-third of the time demanded by liquid, oily or salve dressing.—*Jour. Am. Med. Assn.*, April 30, 1887.

JAMES E. PILCHER (U. S. Army).

**VII. Coffee to Disguise the Odor of Iodoform.** RICHARD NEALE, M. D. Dr. Neale says it is objectionable (1) because the deodorization does not last (2), because it is difficult to grind it fine enough. He recommends macerating the coffee in hot lard or vaseline. All the deodorizing powers are absorbed and an unirritating ointment can be prepared.—*Brit. Med. Jour.*, May 21, 1887, p. 1,095.

C. B. KEETLEY (London).

## OPERATIVE SURGERY.

**I. Kocher's Method of Ankle-Resection from an External Transverse Incision.** By Dr. F. DUMONT (Bern). The many methods of resecting the ankle-joint are, Dr. Dumont suggests, owing to the limited applicability of each. He here describes the method practiced in Kocher's clinic since 1883, and claims that it gives a complete exposure of the joint. It is, therefore, suitable in most cases where the operation is indicated.

The foot being held at its normal right angle, an incision is made from the tendo Achillis, with a slight downward curve over the tip of the external malleolus to the extensor tendons. After dividing skin and fascia the peroneal tendons are exposed, tied with two loops and divided between. This last cut also opens the external part of the talo-crural joint. The ligamentous attachments to talus and calcaneus are then severed, and the joint capsule prepared from the anterior and posterior side of the tibial joint surface as far towards the internal malleolus as possible. The foot can now be readily dislocated inwards, care being taken not to break off the internal malleolus. The interior of the joint is now exposed in its totality. After excision of the diseased parts the foot is again brought to its usual position and the tendons sutured. For this suture he has a special method. The thread bears a needle at both ends. These are passed into the side of the tendon near the end—a little distance apart—and then out through the central part of the cut surface, in again through the corresponding points of the other cut surface and finally out where the free ends of the thread are tied. The advantage of this is that the suture does not easily cut through. The wound is now closed and treated as usual.

This method closely resembles that of Reverdin, except that the latter also divides the tendo Achillis and does not suture the peroneal tendons. In four cases Kocher has performed arthrotomy on this plan for tubercular disease of the ankle-joint in children. The results after from one and three-fourths to two and a half years' observation of the cases were excellent, though, of course, some slight stiffness of the joint usually remained. A fifth case, of his own—girl of 16 years with fungous synovitis—also gave a good result, though motion in the joint had not been recovered up to 14 mo. p. o. All the patients were able to walk well again.

The method is specially recommended for cases where all parts of the joint are affected.—*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. 2.

WM. BROWNING (Brooklyn).

**II. A Rapid and Easy Method of Excision of the Hip Joint.** By MILTON JOSIAH ROBERTS, M. D. (New York). This

method is performed in five stages: (1). The incision through the soft parts, which is begun a little in front of the mid-point of an imaginary line connecting the anterior-superior spine of the ileum and the middle of the summit of the great trochanter; entering the knife at this point, it reaches the head of the bone at the upper and anterior edge of the acetabulum, from which point a curvilinear incision backward and downward is made, and the knife is passed over the summit of the great trochanter at the junction of the middle with the posterior third of its antero-posterior diameter. Having reached the summit of the great trochanter, the incision is extended in a straight line down the shaft of the femur to a point on a level with the lower border of the lesser trochanter; all the tissues, including the capsular ligament are divided down to the bone along the line of this incision, care being taken not to cut through or wound the periosteum in any manner. 2. Having made a clean cut down to the bone, the soft parts on either side of the wound, between the greater and lesser trochanter or at any level where it is desired to make the section of the femur, are severed a little on either side from their connection with the periosteum by means of a sharp scalpel; at no other point along the line of incision are the soft parts severed from their connection with the periosteum; the reason of such severance at the point where it is desired to make the section of the femur, is in order to facilitate the introduction of protecting retractors between the bones and the soft parts. These retractors are broad hooks with a slight curve, which are slipped under the bone on either side so as to clasp it and detach it from the surrounding tissues; where two are used the curve is longer than where only one is used. Pressure on the handles on either side of the wound throws the adjacent soft parts aside and protects them from injury. (3). This being done, the electro-osteotome, provided with a circular saw of appropriate size is now grasped by the hand of the surgeon, the circuit closed and the rapidly revolving saw blade brought down upon the bone at right angles to the shaft, making a perfectly clean and smooth section through the periosteum and bone in from two or three seconds, according to the size of the bone; the sections through the periosteum and bone will thus coincide absolutely throughout. If



the bone were divided inside the periosteum, as some surgeons recommend, a part of the healthy bone on the distal side of the cut would necessarily be denuded of its periosteum. (4). Then the upper end of the femur is removed subperiosteally by dividing the periosteum upon the bone in the line of the initial incision through the soft parts. The end of the femur, which has been cut off, being firmly held within the grasp of a bone forceps, the periosteum is reflected from the bone at either side by means of a periosteal elevator; as rapidly as it is reflected, the fragment of bone is raised out of its periosteal bed by means of bone forceps. When the digital fossa is reached, the attachment of the rotator muscle is divided with the blade of a scalpel and the operation proceeded with. (5). Having cleansed out the acetabulum, if it be diseased, a large-sized drainage tube is introduced and the wound closed by sutures, including all the soft parts and the periosteum.—*N. Y. Med. Jour.*, April 16, 1887.

#### NERVOUS AND VASCULAR SYSTEMS.

**I. Simultaneous Distal Ligature of the Right Carotid and Subclavian Arteries for Innominate Aneurism.** By H. R. WHARTON, M. D. (Philadelphia). A Scotchman, æt. 42, had suffered for eighteen months from pain, running from the throat to the right shoulder and arm, and for six months from dyspnœa and dysphagia, and now presented a swelling above and a little to the right of the sternum; the patient had never had syphilis; inspection and palpation of the tumor showed its pulsatile and expansile character. Innominate aneurism being diagnosed, ligatures were applied by Dr. John Ashhurst, Jr., to the right common carotid artery just above the omo-hyoid muscle, and to the right subclavian artery in its third part, just outside the scalenus anticus muscle. No immediate effect upon the aneurism was observed from the application of the ligature nor were there any cerebral symptoms, but the future history of the case was marked by progressive improvement, and at his discharge from the hospital, two months later, no pulsation was visible or palpable, and the dyspnœa and dysphagia no longer existed.—*Jour. Am. Med. Assn.*, April 23, 1887.



**II. Alarming Hæmorrhage after Excision of the Tonsil.**  
By CLINTON WAGNER, M. D., (New York). In a woman, æt. 30, the subject of frequent attacks of inflammation of the left tonsil, excision was effected with Mackenzie's modification of Physick's guillotine. A rush of blood followed the excision, though not greater than is usual in these cases, but the bleeding increasing instead of diminishing, and the application of persulphate of iron and compression failing, after the lapse of nearly an hour from the operation, the tongue was forced by means of the depressor as far as possible upon the floor of the mouth, exposing, in the space between the pillars of the soft palate and apparently springing from the base of the tongue, an artery of considerable size bleeding with such force that the blood was projected over and beyond the depressed tongue to the opposite side of the mouth. It was without much difficulty taken up with an artery forceps and twisted, which effectually checked the hæmorrhage. The artery was either the tonsillar branch of the facial or the largest of the pharyngeal branches of the ascending pharyngeal. This is the only accident in seven hundred and forty cases of the operation at the Metropolitan Throat Hospital.—*N. Y. Med. Jour.*, April 16, 1887.

**III. Obstinate Hæmorrhage after Amygdalotomy ; Recovery after Ligature of the Common Carotid Artery and Infusion of Salt Solution.** By HENRY B. SANDS, M. D. (New York). A man, æt. 24, had had both tonsils excised with an amygdalotome, the operation being followed by insignificant hæmorrhage. A few hours later bleeding began and continued all night in spite of efforts made to control it by pressure with the fingers, large dressing forceps and styptic cotton ; the bleeding was confined to the right side. The following morning, the patient being greatly prostrated and still bleeding, Dr. S. Fleet Speir tied the right common carotid artery. At 3 in the afternoon, Dr. Sands being called with a view to transfusion, the patient was extremely weak and could scarcely speak, while his pulse was small and rapid and at times almost imperceptible ; blood was slowly oozing from his mouth. On examining his throat, no bleeding point could be detected, but only oozing from the right tonsil, which

ceased after the clots had been scraped away with the finger, perhaps because a better surface was thus afforded for the deposit of coagula. A vein was opened in the arm and a pint of saline solution was introduced in the course of four or five minutes, using Colin's apparatus, with which any entrance of air was prevented; during the operation, the volume and tension of the pulse improved considerably. The patient's subsequent progress was favorable. The patient belonged to a family of bleeders and he had once before bled profusely after the extraction of a tooth; but this could hardly explain the present accident, for in that case there should have been bleeding from both tonsils and also from the wound made during ligature of the carotid; the hemorrhage was probably due to division of a large tonsillary artery.

## HEAD AND NECK.

**I. Removal of a Large Sarcoma, Causing Hemianopsia From the Occipital Lobe of the Brain.** By W. R. BIRDSALL, M.D., (New York), and R. F. WEIR, M.D., (New York). This case occurred in a male Hebrew Pole, affected with cerebral symptoms extending over a period of eighteen months, consisting of left hemianopsia, which could only be accounted for by a destructive lesion in the neighborhood of the gyrus cuneus of the right occipital lobe, and locomotory disturbances, which appeared to be due to the pressure effects of a tumor on structures below the tentorium, and implied a growth of considerable size. Operation having been decided upon a U-shaped flap was raised from the skull, and a one inch trephine applied at one inch above the occipital protuberance and the same distance from the middle line—beyond the limits of both the longitudinal and lateral sinuses—and the bone removed until an oval opening  $2\frac{3}{4}$  by  $2\frac{1}{2}$  inches was made, exposing a dura mater of a deeper hue than normal: section of this exposed the tumor, the outlying edges and base of which could not be reached in spite of further removal of the cranium, and it was therefore incised and some of its softened, granular and fatty-looking contents forced out. Its size was now somewhat diminished and the forefinger could be passed between the cranium and tumor, and by its aid the delicate cellular attachments that held the

mass in place were felt to yield easily, and enucleation became possible and the base was finally reached; by now drawing the finger gently but firmly toward the cranial opening, the tumor was torn nearly completely in two and its outer half lifted out; then the inner part was separated from the falx with the help of the finger end and nail, and withdrawn. Inspection of the mass showed that the tumor had been entirely removed and that its probable attachment had been toward the posterior border of the falx; the tumor was a spindle-celled sarcoma weighing  $5\frac{1}{4}$  ounces, measuring  $3\frac{1}{4}$  inches long by  $2\frac{1}{3}$  inches wide and  $2\frac{1}{2}$  inches thick, and being  $8\frac{1}{2}$  inches at its greater circumference and 7 inches at its lesser. The falx was crowded over toward the left beyond the median line, and the tentorium depressed to the horizontal; two bleeding points were observed, one being in the region of the straight sinus, although not free enough for that vein and probably belonging to the pedicle of the growth, while the other was apparently arterial and possibly from a terminal branch of the posterior cerebral artery. It being found that the hæmorrhage could be checked by direct pressure, the cavity was packed with 5% iodoform gauze, not too tightly, as it was assumed that the released brain would contribute additional pressure, and the ends of the strips of gauze were allowed, for easy extraction, to protrude from the lower angle of the scalp wound; the dura was partly united over the gauze by several loose sutures instead of being brought closely together, and the scalp wound closed with catgut sutures, a rubber drainage tube being introduced under the skin up to the skull opening, and over these sublimated and iodoformed peat bags with sublimated loose compresses of gauze and absorbent cotton were secured with gauze bandages and the patient put to bed. The patient soon showed symptoms of hæmorrhage which could not be controlled by further packing of the cavity, and death ensued thirteen hours after the beginning of the operation. Dr. Weir in another case would favor the application of hæmostatic forceps to the bleeding points, retaining them in place for twenty-four or forty-eight hours. He remarks that sundry experience of injuries over the lateral and longitudinal sinuses together with observations on the cadaver, have convinced him that

the skull over such a sinus can be removed without injuring it and without giving rise to any uncontrollable bleeding or subsequent risk.

Remarking upon the application to cranial surgery of *bone grafting* he stated that after trephining the skull in a case of epilepsy, he had, after closing the dural opening, replaced the two one inch disks of bone which had been removed—they having been, during the half hour intervening between their removal and reintroduction, wrapped in a towel wrung out of warm carbolic solution, which in its turn was then placed in a jar immersed in warm water. After seven weeks the wound was all healed except at a point where a later opening was made for drainage, and the circles of bone appeared to have perfectly united.—*Med. News.* April 16, 1887.

**II. Considerations in Connection With a Fracture of Skull by Contre Coup.** By PAUL BERGER (Paris) and Mlle. A. KLUMKE (Paris). This paper contains a minute discussion of a case from which the following conclusions are deduced: (1) Independent fractures of the base of the skull, produced at a distance from the point of application of external violence on the skull exist. (2) These fractures occupy by preference the orbital prominences, the lesser wings of the sphenoid, and the cribriform plate; they may also involve the petrous portion of the temporal bone. (3) They appear to result from the mechanism assigned by Perrin to fractures of the skull by *contre coup*. (4) Intracranial effusions of blood situated between the dura mater and the skull, determined by the rupture of the middle meningeal artery at the level of a fracture, may occupy the lower region of the middle fossa of the skull and be accompanied by no sign of cerebral compression, even when they attain a considerable volume. (5) Consecutive to a traumatism, a hæmorrhagic focus may be observed in the cerebral substance, produced by *contre coup* at a point opposite to that where the violence was applied, without its being possible to invoke the displacement of the cerebro-spinal fluid as the cause of its production. (6) In recent and considerable traumatisms, there may exist a clearly defined aphasia, without there being any appreciable lesion of the convolution of Broca, of the foot of this convolution, or of

the convolutions of the island of Reil. (7) It is impossible then in case of recent traumatism affecting the skull, to depend either exclusively or even principally upon this symptom, to affirm the desirability of trephining or to determine the point for the application of the instrument.—*Revue de chirurgie.* Feb., 1887.

**III. The Possibility of Successive Self-Inflicted Cranial and Heart Wounds.** By D. HAYES AGNEW, M.D., (Philadelphia). From a series of authentic cases of suicide from perforating wounds of the head and heart, the author concludes: (1) That it is possible for a ball to enter the brain without destroying consciousness, though it may for a few moments cause some mental confusion. (2) That a ball may traverse the brain without causing muscular paralysis. (3) That a suicide may with his own hands, if so disposed, first shoot himself in the head, and within the lapse of a minute inflict a similar wound on the heart, and that there are a sufficient number of cases on record to establish the feasibility of the self-infliction of the two shots. (4) That a suicide may first discharge a ball into the chest, wounding the heart, and immediately after send a second ball into the brain.—*American Surgical Association.* 1887.

**IV. Removal of Neoplasms of Both Parotid Glands.** By JOHN A. WYETH, M.D., (New York). A woman, æt. 47, began to notice, about six months previously, enlargement of both parotid glands. Against the advice of the surgeons she insisted upon operative interference; the right external carotid and superior thyroid were tied and the corresponding neoplasm was dissected out; three months later the more extensive growth on the opposite side was removed with great difficulty. The tumors were round-celled sarcomata. The patient had facial paralysis on both sides, more marked on the left: she could not close her eyes completely but she had no keratitis; she had no pain and could talk very well, and she could chew without much difficulty, and was not obliged to push the food between the teeth with her fingers, although she was restricted mainly to liquid diet. There was slight power of motion in some of the muscles on the left side of the face, but it was difficult to tell whether it was the group supplied



by the motor branch of the fifth nerve, or that supplied by branches of the facial; while the main branches of the facial nerves were seen during the operation, the delay required for the application of sutures would have prolonged the operation beyond all hope of the patient's survival.—*N. Y. Surgical Society*. April 13, 1887.

**V. Closure of the Jaws and Its Treatment.** By J. EWING MEARS, M.D., (Philadelphia). This paper consists of a summary of the subject with the author's method of treatment as used in six cases, five of which were due to bony ankylosis in the temporo-maxillary joint. The methods previously suggested, were: (1) Division of the cicatricial tissues. Section of the masseter and temporal muscles, as originally suggested by Carnochan, when division of the cicatricial bands is insufficient. (2) Excision, more or less complete, of the cicatricial bands or osseous formations, and the subsequent employment in case of the former, for a long period of time, of two wedges and levers to maintain the separation of the jaws. Transplantation of mucous membrane to cover the surface of the wound, as suggested by Dieffenbach, or transplantation of skin, as practised by Jaesche. (3) Division of the cicatricial tissues, and the adaptation of metal shields, not only to prevent recontraction, but to re-establish the sulcus of mucous membrane at the base of the alveolus. (4) Dieffenbach's method of simple division of the ramus of the jaw—and the formation of a false joint *behind* the point of contraction. (5) Esmarch's suggestion that the joint be formed in front of the contraction, and that a segment of bone be removed for this purpose—by external incision. (6) The formation of a false joint *in front* of the contraction by simple division of the bone, made by forceps applied within the mouth—Rizzoli's method. In closure due to ankylosis of the temporo-maxillary articulation, the methods practised are: (1) Formation of a false joint by exsection of the jaw, by external incision (Carnochan's suggestion), or the division of the ramus from within the mouth, either by saw, forceps or chisel. (2) Exsection of the condyle with a portion of the neck, the incision being external, as practised by Prof. S. D. Gross. The objections were as follows: (1) To incision and excision. The reformation of the cicatrix and the great pain to which the patient



is subjected in the use of wedges, levers, and screws—the difficulties of securing flaps of mucous membrane and skin from adjacent parts and their successful transplantation. The almost universal failures. (2) Division of the cicatricial bands and use of shields. The pain and inconvenience experienced by the patient in the use of the shields, and difficulty in obtaining the full coöperation of the patient in carrying out the necessary manipulations within the mouth. (3) Section of the ramus *behind* the contraction—Dieffenbach's method. The difficulty of obtaining a permanent false joint after simple section of the bone. (4) Esmarch's method. The loss of one-half of the jaw for the purposes of mastication, where excision is made in front of the contraction. Its inapplicability when both sides are affected, and the deformity which results. (5) Rizzoli's method. The difficulty in accomplishing the formation of a false joint by simple division of the bone—the tendency to reunion being much greater than when a segment is removed. His first case, one of jaw closure due to the formation of osseous and cicatricial bands involving the left side, the result of a gunshot wound received at the age of 2 years, eighteen years previously, consisted in the exposure of the temporo-maxillary articulation by an incision along and below the zygomatic arch, the excision of nearly the entire ramus of the jaw with the coronoid and condyloid processes, section of the masseter, temporal and external pterygoid muscles, The osseous plate which had formed between the alveolar processes on the palatal surface was sawn through, the saw having been introduced between the teeth to accomplish this purpose. The jaws were now separated to the extent of an inch. The subsequent treatment consisted in the daily use, for a period of four weeks, of the author's mouth-gag, during the formation of the artificial articulation, with the result of securing a separation of one and a quarter inches. About four years after the operation, he found the separation of the jaws to be over *one and a quarter inches*, and the movements in every respect normal. The patient was unable to recognize any difference, in motion or in sensation, between the natural jaw on the right side and that formed upon the left. Later experience, however, caused some modifications of the method, an external cicatrix being avoided by excision of the upper

portion of the ramus, the coronoid and the condyloid processes through the mouth. The plan of operation now recommended is as follows: A straight sharp-pointed bistoury is introduced beneath the masseter muscle on a level with the last molar tooth of the lower jaw. Into the wound thus made the blade of an Adams's saw is passed and the ramus sawn through. The periosteum, with the overlying masseter muscle, is raised by the periosteal elevator, and the wound thus enlarged. The insertion of the temporal muscle is now divided by a probe-pointed bistoury. The tissues on the inner surface are separated by the elevator, the bone seized by the lion-jawed forceps, and an effort made to dislodge it by forcibly twisting it outward. If it yields at the neck of the condyle, the process is afterward chiseled out. If sufficient space is acquired without removal of the firmly ankylosed process, it is permitted to remain, the object being to provide ample space for the formation of an artificial joint. Section of the masseter muscle is made if its tense condition demands it. Hæmorrhage which arises from the division of muscular arterial branches, and possibly of the inferior dental artery, is controlled by pressure effected by packing the wound-cavity with sponges. Wounding of the internal maxillary artery is to be avoided by careful use of the instrument in close contact with the bone in the upper and inner portions.

Section of the inferior dental nerve is likely to occur, producing anæsthesia in the teeth, and regions of the chin supplied by its mental branch. In one case in which this occurred, he observed a gradual restoration of the function. In another, anæsthesia still exists, although nearly a year has elapsed since the operation. The wound-cavity is packed with iodoform gauze,  $7\frac{1}{2}\%$ , and renewed every third day. Manipulation with the mouth-gag is instituted at the end of a week and maintained for a varying period—from six to eight weeks or longer, according to the requirements of the case. This manipulation gives no pain in the newly formed joint. In two instances the renewal of motion has caused pain in the sound articulation. The use of the ordinary chewing-gum, assists materially in maintaining the movements of the jaw during the formation of the false articulation.—*Jour. Am. Med. Assn.* April 16, 1887.

**VI. Sarcoma of the Pharynx Removed by Partial Excision and Dislocation of the Inferior Maxilla.** By FREDERICK LANGE, M. D., (New York). A very vascular, mixed, round and spindle-celled sarcomatous tumor occupied the left half of the pharynx, extending upward behind the soft palate and down the throat so far as to dislocate the larynx. Following Miculicz, preliminary tracheotomy was performed, followed by an incision along the inner border of the sterno-mastoid muscle, and a horizontal incision along the border of the zygomatic arch so as to expose the angle of the jaw; all that portion which corresponded to the insertion of the masseter muscle was removed subperiosteally and the jaw dislocated so as to afford a view of the interior of the pharynx; in spite of this, a clear idea of the connections of the tumor could not be obtained and it was necessary to scrape it out piecemeal, so that the operation was not as thorough as the operator had desired. The growth was about the size of a goose's egg, so that it interfered with deglutition and was beginning to cause dyspnoea. It had no bony attachments and was encapsulated, but broke down rapidly, so that it was impossible to remove it entire, and the operation was long and tedious. The patient had intense iodoform poisoning, being at first greatly excited and then speechless for fourteen days. He was fed by means of a tube which he one day swallowed through the carelessness of a nurse: after being retained for five weeks, the tube—which was  $18\frac{1}{2}$  inches long—was passed per rectum. The patient finally recovered with paralysis of the lip on the side of the wound, but there was no displacement of the teeth and the power of mastication was as good as ever.—*N. Y. Surg. Society*, Feb. 23, 1887.

**VII. Fracture of the Fifth Cervical Vertebra with Recovery.** By ARPAD G. GERSTER, M. D. (New York). A boy, æt. 13, while bathing, dived into shallow water and struck his head so violently against the bottom that he was stunned; paralysis resulted of the left upper and lower extremities and of the bladder and rectum; there was also paralysis of the right upper extremity—with the exception of the shoulder muscles—with paresis of the corresponding leg. On examination it was found that the spinous process of the fifth cer-

vical vertebra was depressed and gave marked crepitation on stretching the patient's neck and letting go of it; the spinous process of the fourth cervical vertebra was abnormally prominent; a distinct prominence could be felt in the pharynx. The head could not be held up without support and, when released, fell over to one side, if the boy was supported in a sitting posture, which had been allowed by his family. Weight extension by means of Glisson's apparatus and also by elevating the head of the bed was applied, and the bladder was emptied by catheter. The patient experienced relief within thirty-six hours after the extension was applied, and within forty-eight hours, four days after the accident, he was able to pass his water naturally; fifteen days later there was a marked improvement in the right side. After two months, he began to walk with crutches and had continued to improve up to date. His gait was still ataxic, while the left arm exhibited evidences of ulnar paralysis, especially the *main en griffe*; the extension of the hand on the arm was incomplete, and as soon as it was released, it at once recovered its former position. The muscles of the arm and forearm were atrophied, and their condition had been but slightly improved by massage and galvanism. No abnormality of outline was to be detected in the neck, the fracture being firmly consolidated while the irregularities observed in the projection of the spinous processes had been smoothed down by callus. No priapism, a symptom frequently described by authors, had been present.—*N. Y. Surgical Society*, April 27, 1887.

JAMES. E. PILCHER (U. S. Army).

## CHEST AND ABDOMEN.

**I. On a Case of Incision and Free Drainage of the Lung for Phthisical Cavities.** By ARTHUR NEVE, F. R. C. S., Edin., (Kashmir). The case which the author has recorded is as follows: A young man, haggard and wasted to a degree, came under treatment for a violent cough and profuse expectoration which had persisted for a year. The expectoration amounted to a pint and a half or two pints in the twenty-four hours. It was tough, and in large, flocculent, purulent masses. Microscopically, it was swarming with bacilli. There

were cavities in the upper and anterior part of the right lung, while the base and most part of the left lung was fairly healthy. For nearly three weeks the patient was treated with cod-liver oil, tonics, eucalyptus and creosote spray and counter-irritation. No improvement followed, and pulmonotomy was done. Chloroform having been administered, the author made an incision two inches long close to the right nipple, and resected a corresponding portion of the fourth rib with the periosteum attached. The pleural surface was firmly adherent. Thrusting his finger upwards and inwards in the direction of the cavities, the author discovered two small ones into which the finger penetrated. The tissues were hard, but friable—no cavities were opened on the axillary side, as it seemed likely that they would drain by the bronchi into the wound. A large sized drainage tube, six inches long, was passed into the lung, and the wound closed by a pad of gauze and a saw-dust bag. Hemorrhage was inconsiderable. Within two days the expectoration by the mouth was diminished to three or four ounces, and was no longer accompanied by the distressing cough of which the patient had complained. The wound was painful; it was daily washed out with corrosive sublimate solution and pure oil of eucalyptus was poured into the tube. This at first gave rise to cough, but was afterwards tolerated. The discharge from the tube was chiefly mucopurulent; at first bloody, later thick and tenacious, but progressively less so. The patient having complained, the drainage tube was removed about the fourth weeks, lest it should cause ulceration into the vessels of the lung. About seven weeks after the operation the improvement was striking, especially in the local signs. The chest around and above the wound was considerably contracted and sucked in. The sinus was freely open, and upon coughing some mucus was expelled from it. The apex of the left lung showed signs of breaking down. The expectoration was about ten ounces in twenty-four hours, but was chiefly clear and watery. His cough troubled him only in the morning; he slept and ate well and gained strength.—*Lancet*, Feb. 5 1887.

II. PERCY DUNN (London).



**II. The Treatment of Empyema in Children.** By L. EMMETT HOLT, M. D., (New York). From a clear and systematic consideration of the subject, the following conclusions are drawn: (1). All methods of treatment yield better results than in adults. (2). We are never justified in leaving a case to nature. (3). Aspiration holds out a reasonable prospect of success in cases of localized empyema; but a very slender one when the exudation is general. (4). If, after two aspirations at most, the pus reaccumulates and shows no tendency toward a transition to serum, this method should not be persisted in. (5). In cases of a large effusion, one aspiration may be done preliminary to the cutting operation, to avoid any possible danger which might result from a too rapid withdrawal of the fluid. (6). In all other cases, a free incision should be made as early as possible, preferably under local anæsthesia, always with the strictest antiseptic precautions. (7). The operation of puncture with a trocar and drainage aims at a cure by the same means as incision; but it is not more safe and is very much less certain. (8). Excision of the ribs is rarely required; never in early operations, as it appears to prolong the discharge without giving any corresponding advantages. (9). The Treatment of empyema cannot better be epitomized than in the words of Wagner: "*Early incision, perfect drainage, and complete antiseptis.*—*N. Y. Med. Rec.*, May 28, 1887.

**III. Acute Empyemia in Children.** By FRANCIS HUBER, M. D. (New York). The author calls attention to the following points which he considers to be frequently overlooked in acute pleurisies in children: (1). In acute pleuritic effusions, pus is probably present in a case in which the constitutional disturbances are severe and the fever is high at the outset. (2). If the effusion does not diminish but continues to increase under treatment, it is probably purulent under these circumstances an early explorative puncture is indicated. (3). If aspiration reveals a purulent fluid containing numerous floculi of fibrin, or if (after aspiration) the pus returns quickly to the same extent or is increased in amount, aspiration is of no avail and more radical means must be employed. Finally, if septic symptoms are present, incise at once.—*N. Y. Med. Rec.*, May 28, 1887.



**IV. Case of Old Thoracic Fistula Cured by Estlander's Operation.** By ARPAD G. GERSTER, M. D. (New York). A male clerk, æt. 21, had had empyema of the left side for upward of a year, and presented lateral curvature, a large fluctuating swelling, and a sinus in the back from which issued a profuse fœtid discharge, while he was much emaciated and suffered with hectic, sweating, etc. The extensive burrowing abscesses of the thorax were incised, and portions of the seventh and eighth ribs resected in order to gain room for the introduction of a large-sized drainage tube. There was a rapid improvement in the patient's general condition, but the cavity did not close. Four months later, Dr. Gerster exsected portions of the third, fourth, fifth, sixth and seventh ribs in the axillary line, making a vertical incision, the exsected pieces increasing in length from above downward. The wound was packed with gauze to prevent too rapid repair of the ribs, and a wide bandage was applied. About three months later the patient was discharged cured, the cavity having healed, leaving a deeply depressed cicatrix. At the present date, seven years later, there was no lateral curvature, the ribs had entirely re-formed and made normal excursions on inspiration and expiration, and there was proper expansion of the left lung.—*N. Y. Surgical Society*, April 27, 1887.

**V. Use of Hot Water within the Peritoneal Cavity during and after Laparotomy to Prevent Shock.—Treatment of Septic Peritonitis and Intestinal Obstruction by the Use of Purgatives, etc.** By W. GILL WYLIE, M. D. (New York). In connection with a tabulated report of 125 laparotomies, of which 74 were removals of the uterine appendages, with five deaths, 26 were ovariectomies with 3 deaths, 7 were suprapubic hysterectomies with 3 deaths, 8 were for ventral hernia, 2 for intestinal obstruction, 2 for permanent drainage of tubercular peritonitis, 1 for nephrectomy, 1 for perityphlitis, 1 for extra-uterine pregnancy, 1 exploratory for cancer omentum, etc., 1 for gall-stones and 1 for general acute suppurative peritonitis which was followed by death, making 12 deaths out of the 125 operations. The operations show a steady reduction of the percentage of loss. The two points which he specially emphasizes are :

(1). That hot water cannot only safely be used to wash out the peritoneal cavity and that it is a simple and efficient hæmostatic for oozing points too numerous and small to tie; but that in prolonged operations, and immediately after the operation, free irrigation of the peritoneal cavity with water at  $105^{\circ}$  to  $110^{\circ}$  is a powerful and efficient agent, lessening, if not preventing, the effects of shock. Towels wrung out in hot water have been used to protect the intestines when turned out of the cavity, but the author does not know that hot water irrigation of the peritoneum for shock has ever before been suggested. The temperature of the water must not exceed  $110^{\circ}$  or it may cause shock itself. (2). That the tympanites and vomiting and other symptoms supposed to be due to septic peritonitis after laparotomy are best overcome by enemata and if these fail, by a quick purgative. That in these cases at least the bowels should be moved and not kept constipated as has been generally practised. It is probable that in many cases the persistent and exhausting vomiting may be the direct result of intestinal obstruction, resulting from bands of adhesions constricting the intestines. For a long time the author has seriously doubted the existence of septic peritonitis in some cases where the vomiting preceded the rise of temperature and other symptoms of sepsis. By experience he has found it best to move the bowels whenever indicated by tympanities or vomiting, even during the first twenty-four hours after the operation—of course, making a distinction between these symptoms and those due to the effects of ether. The vomiting from ether is likely to be preceded by marked nausea, and is usually violent and gagging in character, while that from obstruction is passive and more like eructation. The quantity vomited is large and at first brownish colored, and attended with extreme exhaustion and marked tympanitis. Without doubt the opium treatment taught by Dr. Alonzo Clark has proved to be the best plan for limiting local peritonitis, and when carefully carried out may prevent death in some cases of general peritonitis, but it certainly is not best suited for septic peritonitis following laparotomy. The author usually gives enough opium or morphine to relieve pain and restlessness and keep the respirations down to 16 or even 12, in some cases; but when tympanites or eructive vomiting begins, he at once moves the bowels by turpentine or ox-gall enemata,

or by a seidlitz powder or Rochelle salts. He acknowledges a hint from a remark of Lawson Tait that a brisk purgative would cure septic peritonitis, but the method of effecting it and the explanation as to preventing intestinal obstruction he claims as his own.—*N. Y. Med. Rec.*, March 19, 1887.

**VI. Splenectomy for Wandering Spleen.** By WILLIAM H. MEYERS, M.D., (Fort Wayne, Ind.). Having been impressed by an autopsy with the feasibility of relieving an enlarged and displaced spleen by extirpation, the author determined to attempt the operation in a future similar case. In case of a woman with an enlarged and dislocated spleen of malarial origin, anti-malarial treatment was advised, but nine months later, the tumor having greatly increased in size and settled down upon the rim of the pelvis, while three suppurating sinuses passed from it through the abdominal wall, although the patient presented a state of extreme exhaustion, the tumor was removed by abdominal section. The pedicle was ligatured in two portions, cut short and dropped into the cavity. All hæmorrhage was carefully arrested and through antiseptic precautions applied to the operation and the dressing, a glass drainage-tube being left in the cavity until the twelfth day, thorough which the abscess cavity was daily flushed with a 1-20 carbolic solution. The patient left the hospital in twenty-one days and ultimately fully recovered. The spleen weighed 7 pounds.—*Jour. Am. Med. Assn.* April 2, 1887.

JAMES E. PILCHER (U. S. Army)

**VII. Three Cases of Splenectomy.** Case I. By A. G. PODREZ (Harkoff, Russia). In his paper read before the Russian physicians assembled in Moscow in January, 1887, Dr. P. gave a brief account of all known cases of splenectomy, numbering 41, beginning from that of the Neapolitan surgeon Zaccarelli who, in 1549, has successfully removed the spleen, and his patient, a woman, recovered. Dr. Podrez's own case is as follows :

M. G., female, æt. 36, for long time was suffering from malaria ; her spleen was largely hypertrophied, and she was suffering from ascites and cachexia ; she entered the clinic Nov. 12, 1886. Splenectomy was

performed as *indicatio vitalis*, Nov. 22, 1886. Under chloroform an incision was made 6 inches long along the external edge of m. rectus abdom. sm. Having separated the spleen from the surrounding organs (fibrous fasciculi), it was brought out into the opening. While an assistant was supporting the spleen Dr. P. undertook to put ligatures on its vessels. The spleen being dropped by the assistant, vena lienatis was ruptured, causing a profuse hæmorrhage which, however, soon was stopped and operation was finished in forty-six minutes. The weight of spleen (bloodless) was 1,756 gm. Iodoform dressing. Ice and opium were prescribed. November 23, nausea and vomiting. November 25, on the face and hands there appeared spots like those of urticaria; she took beef tea and wine. November 26, chills and fever. November 28, meteorismus. November 30, examination of blood showed the same ratio of white blood corpuscles to the red ones as it was previous to the operation, viz., 1 white to 200 or 250 red. December 1 to 3, the patient showed deafness and complained of pain in the left side. December 6, wound healed by the first intention. December 7 to 8, she sits up. December 11 to 12, she gets up. December 15, chill and fever and delirium. December 18, diarrhœa, vomiting and albumen in urine. December 20, by paracentesis there was removed about 3 litres of transparent fluid. December 22, pulse, 140; temperature, 103; continuous nausea. December 27, the patient died. On post mortem examination it was quite apparent that she suffered from chronic peritonitis and parenchymatous nephritis. Dr. P. stated that out of 42 cases of splenectomy only 10 were favorable results.—*Chirurgichesky Vestnik* (St. Petersburg), March, 1887.

CASE II. By Dr. DONAT (Odessa, Russia). E. B., female, æt. 25, entered Odessa City Hospital July 29, 1885. For five years she was suffering from malaria, complained of severe pain in the left side, and her physician made a diagnosis of "flying spleen." Operation was performed on August 13. An incision was made in the linea alba. The spleen was brought into the opening and ligatures was placed one after another on all vessels. Operation lasted forty minutes. In first days after operation, nausea and vomiting. The course was normal. September 21, she left the hospital cured. In August, 1886, she was

quite well. July 22 she was delivered of a healthy child. The removed spleen was eight times as large as the normal one. Ratio of white corpuscles to red ones was, on the eve of operation, 1 to 250; twenty-two days after operation, 5 to 1,000; six months after operation, 6 to 1,000.—*Chirurgichesky Vestnik*. April and May, 1887.

CASE III. By Dr. ORLOVSKY (Warsaw, Russia). Hana E., æt. 26, entered the Warsaw Hospital June 7, 1885; she had hypertrophy of spleen and ascites. Splenectomy on June 26, 1885. An incision along the edge of rectus abdom. m. The spleen was found connected by fibrous fasciculi only with diaphragm and omentum. On having cut lig. gastro-lienale (ligatures were placed before that), spleen was brought to view and then separated from the diaphragm, but that was not done without a profuse hæmorrhage. First days after the operation passed without fever. On the fourth day inflammation of the right lung was discovered, with rise of temperature. On July 2, death. The removed spleen was 30 cm. long and 18 cm. wide. Microscopical examination supported the diagnosis. Tumor fibrosus lienis.—*Gazeta Lacarsca*. No. 1, 1887.

P. J. POPOFF (Brooklyn)

VIII. A Case of Cholecystotomy. By O. TERRILON (Paris). The patient had never presented any phenomena of biliary retention, but twenty days before the operation she presented disquieting symptoms of debility and lack of nutrition, the pathogeny of which is very obscure. There appeared a tumor in the umbilical region. An incision at the most prominent point exposed a whitish fluctuating tumor, puncture of which yielded 300 grammes of a clear, transparent liquid, containing a few crystals of cholesterine. The sac was then drawn without, fixed to the lips of the wound, and incised. A calculus almost free was easily removed, but another firmly fixed in the orifice of the duct, could be dislodged only with great difficulty. The fact of the liver's having descended very low and being almost vertical rendering ablation of the adherent sac difficult, the operator resorted to a partial resection, with suture of the edges of the sac to the skin *en collette*, and drainage. The immediate results were excellent. Three weeks afterward, there was left only a small fistula, which closed after



two cauterizations with red heat. Cicatrization was complete in five or six weeks.—*Société de chirurgie de Paris*, Feb., 1887.

**IX. Laparotomy for Gunshot Wound of the Intestines ; Suture and Recovery.** By CORNELIUS KOLLOCK, M. D. (Cheraw, South Carolina). A negro farm laborer, æt. 15½, was shot with a 38-calibre pistol, from a distance of six feet, the ball entering the left inguinal and emerging in the right umbilical region about 1½ inches from the median line. Six hours after the injury, he presented emphysema about the wound, hepatic resonance and bloody stools. Laparotomy was undertaken without professional assistance and with none of the accessories regarded as so important in hospital practice. Through an incision of three inches in the median line, the abdominal cavity was exposed and three intestinal openings were found ; two in the descending colon, the ball having entered a little above the sigmoid flexure and passed through ; and a third at the point where the ball emerged from the cavity, it having cut through a knuckle of the small bowel ; these wounds were closed by Lembert sutures of catgut, and an appendix epiploicæ, which was found lacerated and bleeding freely, was tied with catgut at the base and cut off. The toilet of the peritoneum was carefully performed with hot carbolized water, and the abdominal opening closed, the bowels were kept locked by repeated doses of morphia for eight days, during which an occasional glass of milk was the only food allowed. On the eighth day, the abdominal sutures were removed, union by first intention having taken place, and on the ninth there was a natural healthy movement of the bowels. The patient fully recovered without a bad symptom.—*Med. News*, April 30, 1887.

**X. Laparotomy and Intestinal Suture for Pistol Shot Wound of the Abdomen.** By R. A. KINLOCH, M. D. (Charleston, S. C.). The subject of laparotomy for perforating gunshot wound of the abdomen was introduced at the last meeting of the American Surgical Association by Dr. Charles B. Nancrede's paper, given in full in the *ANNALS OF SURGERY*, Vol. v, page 465. Professor Kinloch then reported the following case: A colored man, æt. 27,



was shot with a 38-calibre pistol ball, which entered  $1\frac{1}{2}$  inches to the left of the umbilicus. Two hours after the injury, there was slight shock and the patient appeared to be comfortable, with the exception of a slight pain on the inside of the left thigh. Anæsthesia being induced and perforation of the abdomen being established, the belly was opened by a median incision under the carbolic spray, and the intestines examined in detail and wrapped in towels wrung out of a warm 1-1,000 sublimate solution; the jejunum presented four wounds, two of entrance and two of exit; the ileum was wounded twice; and the mesentery was perforated in two places and was also badly torn. Free bleeding from a mesenteric vessel was controlled by hæmostatic forceps and later by silk ligatures. All the wounds were closed by Lembert's sutures by a fine round needle with antiseptic silk. The mesenteric wounds were brought together as far as possible, but there was an infiltration of blood which could not be removed. The abdominal cavity was irrigated with a weak sublimate solution, the external wound closed with silver sutures and a large rubber drainage tube introduced, antiseptic precautions having been observed throughout the operation. The next morning vomiting occurred, and an examination of the wound showed that a suture had given away and a knuckle of intestine protruded, which was reduced and the opening closed. The temperature arose that evening, vomiting again occurred, and the patient suddenly expired shortly before midnight. The autopsy showed no adhesion of the parietal peritoneum, but all the intestinal sutures had held, and there was no fæcal extravasation, although a half a pint of dark, sero-sanguinolent fluid was found in the cavity. A circumscribed abscess was found in the mesocolon, out of the line of the bullet which was found behind the body of the fourth lumbar vertebra on the left side. —*American Surgical Association*, 1887.

**XI. Pistolshot Wound of the Liver, Stomach, Mesentery, Small Intestine and Kidney; Intestinal Suture and Nephrectomy; Death.** By W. W. KEEN, M. D. (Philadelphia). A woman, æt. 18, shot herself with a 32-calibre pistol, the ball entering over the ninth rib, which was fractured,  $4\frac{1}{2}$  inches above and  $3\frac{3}{4}$  inches to the right of the umbilicus, and being found under the skin

1½ inches above and 8 inches to the left of the umbilicus. There were no positive signs of involvement of the abdominal cavity, but an explorative operation was undertaken, 8½ hours after the injury, the line of incision intersecting the course of the ball so that if it had passed in the belly wall only, its track would be found. On opening the abdomen neither blood nor serum escaped, nor was any extravasated food or faeces noticed, nor was there any peritonitis. A wound was found, however, on the anterior wall of the stomach near the pylorus, and later what appeared to be one of two small patches of extravasation on the infero-posterior wall was found to be the small round wound of exit from the stomach, obscured by a slight coating of blood. These were closed by Lembert's sutures of the finest iron-dyed silk, an ordinary round sewing needle being used, and only the peritoneum and muscular coat being caught in the stitches. Extensive extravasation in the mesentery drew attention to a wound of the superior mesenteric vein just before it formed the portal vein, and a lateral ligature of chromic gut was applied to it; a small wounded artery was also ligatured, as well as a moderate bleeding point in the omentum. The anterior border of the liver had been scalloped by the ball, but as there was no bleeding, it was let alone. In addition, a large wound was found in a coil of small intestine in the left flank; it was 1¼ by ½ inches, the long axis in the axis of the bowel and almost at its mesenteric attachment; this wound was closed, no further lesion of the bowel or mesentery being discovered after careful examination of the entire alimentary tube. A wound of the left kidney was observed, however, its anterior surface having been ploughed through from the hilum to the opposite border half way through its entire thickness, one-third of its length above the lower end; the organ was extirpated, a drainage tube being drawn from the point cut through the abdominal wound. The condition of the patient was by this time such that the toilet was rapidly made and the abdominal wound closed *en masse*, without delaying to suture the prerenal peritoneum or to separately stitch the anterior peritoneum. She rallied excellently from the operation and did well for seven days, the wound of entrance completely closing and that of exit healing except for a drainage tube; a slight

gaping occurred in the belly wound, which was closed however by adhesion of the omentum. On the eighth day she was seized with rigors and high temperature, indicating a condition which continued with some variations until the thirteenth day, when the belly was again opened by freeing the adhesions between the omentum and the gaping abdominal wound, and the fingers passed into the cavity; no indications of peritonitis, pus or further injury were discovered, and the wound was again closed; the patient suffered no shock from this operation, but gradually failed until the fifteenth day, when she died. Autopsy revealed the blood in the mesentery disintegrating and suppurating, though no abscess existed nor was there any free pus in the peritoneal cavity; the wound in the small intestine was entirely healed, but on the other side of the mesentery, corresponding in position to the lower end of the wound, was a spot in the bowel wall as large as a five cent piece, which was gangrenous, and in its center was a double perforation of bowel, with pus in the caliber of the gut; the mesentery also showed local gangrene at this point. There was general peritonitis, which must have appeared after the latter operation.—*American Surgical Association*, 1887.

**XII. Enterectomy for Strangulated Hernia.** By N. B. CARSON, M. D. (St. Louis, Mo.). This paper consists of a report of a new case with remarks upon the operation in general. A boy, æt. 12, presented in his right groin a lump, about the size of a hickory nut. He had been suddenly seized with abdominal pain, which increased and became accompanied by vomiting. Strangulated hernia was diagnosed, and the sac opened, allowing the escape of two or three drachms of sero-purulent fluid. The knuckle of intestine was destroyed beyond recognition, and the stricture was so tight that there seemed to be no doubt but that the gut had been cut through, and if any attempt were made to divide the stricture, the adhesions would be broken and fecal extravasation result. Median abdominal section was then made and the strangulated gut drawn out; it was then discovered that only about four-fifths of the circumference of the gut had been strangulated, while the remainder had been so tightly drawn to the border of the ring as to completely occlude it. The gut being

held by an assistant above and below the lesion and the contents being pushed away, the injured part of the intestine, two and a half inches in length, together with a triangular segment of the mesentery, was resected, the ends sutured with Lembert's suture, the abdominal cavity carefully cleansed, and dressings applied. The case progressed to an uninterrupted recovery, with a healthy spontaneous evacuation of the bowels on the fifth day. The writer notes that shock after the cutting away of the dead bowel is one of the chief dangers of the operation, and recommends a hypodermic injection of brandy and morphine or ether, just before this part of the operation is reached, in order to counteract the shock.

He advises, in conclusion, in cases of strangulated hernia: (1). When the bowel has been out some hours, and when it has been constricted sufficiently to render its return to a healthy condition at all doubtful, that it should be resected at once, if the condition of the patient is such that he or she can withstand the shock of the operation. (2). If the condition of the patient is such as not to admit of immediate resection, he would advise that the bowel be incised and left in place without interfering with the stricture until such time as the condition of the patient will allow the more radical operation. (3). If the resection is to be made as a primary or secondary operation, he would advise that the abdomen be opened in the median line, as by so doing he believes that we enhance many times the chances of recovery of our patient, while we do not in the least add to the dangers of the operation.—*Jour. Am. Med. Assn.*, May 7, 1887.

**XIII. Operation for Ventral Hernia.** By J. EDWIN MICHAEL, M. D. (Baltimore). A woman, æt. 55, fell several years previously such a way as to be struck in the median line, half way between the umbilicus and the pubes, by the handle of a washtub, without breaking the skin, causing a rupture in the linea alba through which the intestine soon came to protrude, no peritonitis following the injury. The belly wall was full and fat, but through it could be recognized the opening, elliptical in shape with the long axis parallel to that of the abdomen, apparently about  $2\frac{1}{2}$  inches long and presenting a firm, hard

and apparently cicatricial margin. Reposition of the guts was easily obtained on assuming the supine posture, but it was impossible to retain them in the abdominal cavity. Under antiseptic precautions the ring was exposed and its lips were drawn together by stout silver wire sutures, passed about three-fourths of an inch from the edges and a little less than half an inch part. No shock followed the operation, the patient making an excellent recovery and finding it necessary to wear a supporting bandage only a few months after the operation. He based his operation upon the fact that a firm cicatricial band of fibrous tissue is formed around foreign bodies lodged in the tissues of the body, and, although so far as he was aware, he was without precedent or authority in the operation, he had assumed that if he placed silver wires in the tissues in this manner, the fibrous tissue which would enclose them would be sufficient to close the hernial ring.—*American Surgical Association*, 1887.

#### EXTREMITIES.

**I. The Treatment of Ruptured and Divided Tendons.** By C. H. WILKIN, M. D. (New York). This paper presents a table of 32 hitherto unpublished cases, of which 28 were treated by suture, with good results in 22 and benefit in all. He considers the injury in two classes, simple and compound. While in the former almost all authorities seem to agree that rest and position are sufficient, yet it would seem that a better result and certainly closer apposition could be obtained by the use of the suture; of the propriety of the suture in the compound variety, there can be no question. The plan of treatment recommended, is first thorough cleansing of the part and irrigation of the sheath of the tendon with a 1-1,000 bichloride solution—except when the knee-joint is involved, when it should be 1-5,000—by means of a small English catheter with a syringe attached, cocaine anæsthesia, and the use of silk-worm gut suture, two sutures being necessary in the average tendon, one being carried transversely through the tendon and the other antero-posteriorly.—*N. Y. Med. Rec.*, April 2, 1887.

**II. Suture of the Divided Ends of a Ruptured Quadriceps Extensor Tendon with Perfect Recovery.** By CHARLES



McBURNAY, M. D. (New York). A man had slipped while lifting a heavy packing box from a truck ; the edge of the box struck him just above the patella, causing a rupture of the quadriceps tendon near its insertion, but no external wound. A transverse incision across the joint above the patella showed that the capsule was extensively lacerated on either side of the bone, while there was a quantity of coagulated blood within the joint cavity. The fibrous fringes and the torn ends of the muscle were turned inward. The latter were excised, the rent in the capsule was closed with catgut and the ends of the tendon were kept in close apposition by quill sutures which were secured by doubled silver wire passed through the edge of the patella. A plaster dressing was applied and the wound healed quickly, the recovery of motion being slow, but eventually complete, although the patient had refused the use of passive motion, so that there was apparently no difference between the two limbs.—*N. Y. Surgical Society*, April 13.

JAMES E. PILCHER (U. S. A.)

**III. Synovial Cysts in Connection with the Knee-Joint ; Synovial Cyst of the Wrist ; Operations ; Recovery.** Mr. CHAUNCEY PUZEY. Case I. Synovial cyst in calf of leg, communicating with knee-joint ; synovial cyst of wrist. Patient, aged 26, had rheumatic fever four years before, when wrist joint and knee joint were most affected. A month before admission a slight contusion of wrist caused a swelling of the wrist, which had never quite recovered after the rheumatic fever. This swelling was situated over the radial side of the back of the wrist, extending from the base of the first metatarsal bone to two inches above the wrist. No heat or redness. Swelling divided into two by annular ligament. Fluctuation existed between these two portions, and a sort of crepitus could be felt within the sac on pressure. The right knee joint was considerably distended with fluid, and there was a large fluid swelling at the upper part of the calf, obviously communicating with the knee joint. Under Listerian precautions the swelling over the wrist was laid freely open by two incisions above and below the annular ligament, a few melon-seed bodies squeezed out and the sac stitched to the skin. The wound healed by granulations and the power of the wrist was afterwards greatly im-



proved. A few months later the man returned to have the knee operated on, as its condition prevented him from working. The swelling in the calf was laid freely open under antiseptic precautions and the sac was found to be very thin everywhere, except at its upper part, where it was constricted and communicated by a narrow channel with the upper and more deeply seated swelling. The communication with the joint could not be found. As much as possible of the sac was dissected out and a drainage tube left in. Made a good recovery.

Case II. Synovial Cyst in Popliteal Space. Patient, aged 51 years, commercial traveller. Complained of weakness in left knee. There was a swelling the size of a small Tangerine orange in lower part of popliteal space, slightly to inner side of median line. No pulsation, redness or tenderness. When the knee was flexed it disappeared, but became more prominent and very tense on extension. Palliative treatment failing, the swelling was laid open antiseptically. Sac very thin, but no communication with joint was found. As much as possible of cyst wall was scraped away. drainage tube inserted and leg fixed on a splint. Made a complete recovery.

Mr. Puzey considers that if the cases are seen early palliative measures should certainly be tried, but unfortunately usually fail. He thinks that subcutaneous rupture, either by force or a tenotomy knife might be successful; but prefers free incision and drainage if strict Listerian principles can be employed.—*Lancet*, Dec. 4, 1886.

H. II. TAYLOR (London).

**IV. Further Cases of Plastic by Fresh Pedicled Flaps from Distant Parts of the Body.** By Prof. H. MAAS (! Würzburg). As an addition to like cases previously reported by M. [v. ANNALS, 1885, June, p. 572] three new ones are here given in which success was attained by the above method.

In the first case there was extensive ulceration on the outer side of the left leg, which had withstood all other attempts at cure. The trouble originated in a large phlegmon from a contusion over a year previously. The depressed atonic sore was surrounded by a wide cicatricial zone. The ulcerated surface was cut around and prepared off, leaving a 12 x 4 ctm. defect. To avoid oozing into the dressing as

far as possible, constriction was not applied. The next step consisted in forming a flap from the inside of the right leg. This was 16 by 6 to 7 ctm. It included fascia and was taken longitudinally with its base at the middle of the leg. The large saphenous vein had to be tied. Each foot and lower part of leg was put up in plaster and then so placed that the slightly flexed left extremity lay on the extended and slightly rolled outward left. The two plaster bandages were then united together by a third. In this way the flap could by moderate twisting be laid in the defect. Finally, the free flap edges were carefully sutured in place, the wound surface covered with a porated tag, an ample gauze dressing applied and the two knees further immobilized by plaster. This position was well tolerated. Dressing first changed 12 days p. o. As the flap had completely united the pedicle was divided and the plaster bandages removed. Discharged in seven weeks with all wounds completely healed, the transplanted flap then measuring 11x4 ctm. Subsequent observation proved the permanency of the cure.

The second case, in a boy of 5 years and six months, was one of loss of the heel skin from an accident. The last point to heal over was about the posterior end of the calcis. But the scar tissue covering the whole heel ulcerated afresh on slight use. At the end of six months the foot was in equinus position, and presented a three and a half to one and a half ctm. ulcer over the calcis.

Both extremities were flexed at knee and hip—the right more than the left—so that the affected heel lay on the inside of the left calf, and each separately covered with plaster about the knee and adjacent parts of thigh and leg. The two were then immobilized in this position by a third plaster bandage. The heel sore and adjacent cicatrix, to the extent of 4 ctm. sq., was removed, and subcutaneous tenotomy performed to correct the equinus position. The tuber calcanei was now only covered by periosteum. The flap was taken longitudinally from the inside of the left leg, with its pedicle above. It was 8x5 ctm. in extent and included skin and fascia. The length of flap allowed the necessary twisting—nearly to a right angle. It was secured in place by catgut sutures at the anterior upper and lower edges, and covered

with boric ointment. The whole operative field was then well dressed with sublimated gauze. No fever. Permanent dressing removed in six days. The flap having entirely united the pedicle was cut and the plaster removed—probably at the earliest date in any case yet recorded. Within two weeks even the line of severance had healed. Color and temperature normal. Sensation returned rapidly *after* the first four days. The next four weeks he went around in common shoes and the skin took on much the same character as that of the other heel. No recurrence of ulceration.

CASE III. Man of 53. Skin torn from left elbow region by a machine. The defect at first extended 25 ctm. along the back of arm and forearm by 20 ctm. across. As after four and a half months' treatment an open place still remained over the olecranon, a substituting flap was drawn from the left breast and hypochondrium. The patient was placed on the right side. First the sore, with its surrounding very thin cicatrix, in the form of a 10 x 7 ctm. rectangle, was prepared off. The arm, bent at a right angle, was laid on the chest and the desired flap determined. The pedicle fell rather behind the posterior axillary line. The upper flap edge was on a level with the tenth rib; the lower, 10 ctm. below; the front edge in the mammary line, length of flap 13-14 ctm. The forearm, half supine, was brought to a right angle and the arm firmly pressed against the thorax. After adjustment and fixation of the flap and abundant cushioning, the whole was fixed in position with plaster (of Paris) like a Desault dressing. Dressing removed and pedicle divided on ninth day. Later there was a slight border-gangrene along the upper edge, but in five and a half weeks everything had firmly healed over and he could be dismissed. Sensation had returned fairly, yet was not as good as on the other side.

He repeats his former directions for securing union of fresh skin flap; immobilization in most comfortable position by plaster (of Paris). Excision of the ulcer surface. Flap formation in the main direction of the vessels. Fixation of the flap with sublimated catgut sutures. Antiseptic permanent dressing.—*Arch. f. Klin. Chirg.*, 1886, Bd. 33, Hft. ii.

W. BROWNING (Brooklyn.)

## GENITO-URINARY ORGANS.

**I. Some Observations on Rupture of the Urinary Bladder.** By Sir WILLIAM MACCORMAC. This paper is based upon two cases of intra-peritoneal rupture of the bladder. In each case abdominal section was performed very shortly after admission into hospital. The rent in the viscus was exposed and carefully closed by numerous interrupted silk sutures. The peritoneal cavity was then thoroughly washed out with warm boric solution and the external wound closed. An uninterrupted recovery followed in both instances, being the first, the author believes, upon record.

CASE I. An old soldier, æt. 33, ran full-tilt against an iron post which struck him in the region of the umbilicus. He fell to the ground, but got up and walked home, a distance of 250 yards, in great pain. He had micturated an hour and a half before the accident. Vomited twice and had constant desire to micturate, but failed. The following day, being unable to pass water and the abdominal pain increasing, he came to the hospital, walking one mile unaided.

On admission, fifteen and a half hours after the accident, the abdomen was distended and tender. There was dulness in both flanks, varying in extent with the position of the patient.

No symptoms of shock. A soft catheter drew off one and a half ounces of blood-stained urine, and on a second occasion 95 ounces of a slightly red-colored fluid by which the level of dulness in the flanks was diminished.

Operation, nineteen hours after the injury. Abdominal section disclosed rent in the posterior aspect of the bladder, extending from the inferior fundus to the recto-vesical cul-de-sac. It was median and vertical and four inches long. Sixteen sutures of fine silk were introduced after Lembert's method, including the serous and muscular coats, only at intervals of about a quarter of an inch, beginning at the lower part which was somewhat difficult to get at, being so deep in the pelvis. A few catgut sutures were also inserted between the others where the closure did not seem perfect. The bladder was proved water tight by moderate distention. The peritoneal cavity was finally irrigated with two gallons of a 1 per cent. solution of boric acid of a

temperature of 98° F. There was no sponging of the serous membrane. A glass drainage tube was introduced—from the centre of the wound to the recto-vesical cul-de-sac and the abdominal wound closed by silk sutures. A soft black catheter was fastened in the urethra. The operation lasted two hours and was conducted under carbolic spray. Convalescence was rapid and uninterrupted. The catheter was removed on the third day and the drainage tube on the fourth. Within a fortnight the abdominal incision had cicatrized.

CASE II. A stout man, æt. 37, fell 18 feet off a scaffolding in a sitting posture. He did not consider himself much hurt, but on trying to micturate, failed; however, the desire soon left him. There was no particular pain, nor distress of any kind. The accident took place at 11:45 A. M. He had drunk one pint of beer about a half hour before the accident, and had micturated about the same time. He had also had one pint of beer between 6 and 7 A. M. Towards evening a desire to micturate came on, and a little abdominal pain, both of which symptoms considerably increased by the following morning.

On admission, a No. 6 silver catheter drew off six ounces of coffee-colored urine. The abdomen was tender all over. Resonant in front, but dull in the extreme flanks—the dulness shifting with the patient's position. Temperature 97°. Pulse 143. Operation twenty-seven hours after injury. On laying open the peritoneal cavity a large quantity of clear fluid—serum *garnie*—escaped. An irregular obliquely placed rent in the bladder was then exposed, situated at the upper and posterior part and slightly to the left of the middle line. It was much more extensive in the outer than in the inner wall, measuring two inches in length, where the peritoneal and muscular coats were torn and a quarter of an inch where the mucous membrane had given way.

The rent was closed by 12 fine silk sutures less than a quarter of an inch apart, and the operation conducted in other respects as in the previous case, with these two exceptions: no catheter was retained in the bladder, as confidence was felt in the complete closure of the vesical wound, nor was a drain used for the peritoneal cavity. A small tube was, however, inserted into the lower part of the abdominal



wound, iodoform. Iodoform gauze, salicylic wool were retained in position by carbolic gauze and flannel bandages.

Shortly after the operation the patient involuntarily passed three ounces of urine, and he continued to void a small quantity in this way at short intervals until the following day when he regained control and passed urine every two hours. There was no blood in the urine, and on the third day control was complete, and he emptied the bladder every three or four hours without trouble.

Temperature rose on second and third days to  $101^{\circ}$ . A fortnight after the operation the patient was quite well.

Sir William lays stress upon the accurate and complete suture of the bladder wound by sutures inserted through the whole thickness of the serous and muscular coats, carefully avoiding the mucous coat. The serous surfaces should be inverted, brought into close contact and the first and last stitches inserted quite beyond the extremities of the wound, so that leakage at either angle, the most common place for it to occur, may be impossible. Carbolyzed silk is the material recommended. The author points out that when the mucous coat has been pierced in animals the result has nearly always been fatal. The mucous membrane falls between the edges of the wound on drawing the sutures tight, and hinders union. The loop of suture within the bladder is a foreign body, and salts are deposited on it. The urine may find a channel to the interior of the wound or the cavity of the peritoneum through the suture-tracks in the mucous membrane. He considers that the rectal tampon might be of advantage in raising and steadying the bladder. Concerning the retention of a catheter, it is pointed out that this favors the occurrence of septic decomposition within the bladder and hinders the healing process in the rupture. If the rent is effectively the patient runs less risk from moderate distension of the bladder, which is all that can possibly occur in a case properly treated. The author also thinks that the retention of a catheter is not to be recommended with excepting in cases of rupture of the bladder. In conclusion he states that the interference of bolder



**II. Litholapaxy in Male Children and Male Adults.** By Surgeon Major D. F. KEEGAN, M. D. In this paper, which extends through four numbers of the *Lancet*, 58 cases of litholapaxy in male children are brought forward. They were all performed in the Indore Charitable Hospital during a period of five years, by far the greater number by Dr. Keegan himself. The ages of the children range from 16 months of age to 14 years. And in no less than 9 cases the children were under 3 years of age. In the series there is only one death, and this happens to be the only case where the crushing had to be repeated.<sup>1</sup>

The author advocates litholapaxy in preference to lateral lithotomy in the treatment of the great majority of stones in male children, principally for two reasons, viz., rapidity of cure and absence of a cutting operation. He points out that the idea originated with his predecessor, Deputy Surgeon-General T. Beaumont, who went so far as to order out from England some specially small lithotrites and evacuators but left Indore before they arrived. Six lithotrities on male children were, however, successfully performed by him prior to this.

After this extensive experience Dr. Keegan gives his conclusions as follows: "I may at once answer this question by stating that with my present experience of this operation in boys, I would almost as soon think of performing lateral lithotomy on an old man the subject of a small uncomplicated stone as I would think of performing lateral lithotomy on a boy whose urethra would readily admit the passage of suitable lithotrites and evacuating catheters and whose stone was neither abnormally large nor hard. The only cases of stone in male children which I nowadays receive for lateral lithotomy are those in which litholapaxy is contraindicated by reason of the existence of a very narrow urethra or the presence of an unusually hard or large stone."

It is shown that the urethra in boys is much larger than is generally supposed, and that, as Otis has shown in the adult, the size of the meatus is no guide to the calibre of the urethra. The author finds that, gen-

<sup>1</sup>The weight of the heaviest stone removed is 700 grains from a boy æt. 9 $\frac{1}{2}$ . It consisted of uric acid nucleus, oxalate of lime, with coating of phosphates. The operation lasted 182 minutes and the boy left the hospital in ten days.

erally speaking, the urethra of a boy from 3 to 6 years of age will admit a No. 7 or No. 8 lithotrite—English scale—and that the urethra of a boy 8 or 10 years of age will admit a 10 or 11 sometimes a 14 lithotrite. He further states that he finds it quite easy to crush or remove a mulberry calculus weighing between two and three hundred grains in an hour's time by means of a No. 8 lithotrite and a No. 8 evacuating catheter. It is recommended that the evacuating catheters should be as short as possible and fitted with a stylet to push back any fragment impacted in the eye, whereby injury to the urethra is avoided.

Fenestrated lithotrites beginning at No. 6 and running up to No. 10 (English scale) should be at hand, if litholapaxy in male children is to be successfully undertaken.

After giving an account of several very interesting cases of litholapaxy in the adult, Dr. Keegan says that believing litholapaxy to be the best method of dealing with the vast majority of stones met with in men, women and children, he views with considerable apprehension the attempts which are now being made in England by the advocates of suprapubic cystotomy (lithotomy) to apply this revived surgical procedure to the treatment of many cases of stone which would be more appropriately and expeditiously disposed of by Bigelow's operation.—*Lancet*, Dec. 4, 11, 18, 25, 1886.

F. SWINFORD EDWARDS (London).

**III. Experience With Calculous Operations in Children.** By Dr. A. SCHMITZ (St. Petersburg). In consideration of the interest of late shown in this subject S. here presents the results achieved from 1870 to 1885 in the Oldenberg Hospital for Children at St. Petersburg. There were in all 98 cases of stone in children, 91 in males, 7 in females. On 86 of these 95 operations were performed, 12 not having been operated at all. These were divided amongst 38 suprapubic, 15 median and 13 lateral lithotomies, 18 lithotripsies and 11 simple urethrotomies. The various operative methods are taken up in order. After noting several collections, covering the suprapubic operation, of Günther (to 1851), Flury (1879), Dulles, (1875), Garcin (1883), etc., he tabulates 101 other cases from recent publications.

Certain points in his method of doing this operation may be noted.

Benzoic acid is given internally for a short time. After narcosis the bladder is for the first time repeatedly washed out with boric solution. The rectal balloon he has never used. To secure the bladder wall a loop is passed through beside the point of the catheter; this is usually left for a few days to have easy access in case of hæmorrhage or slipping out of the drains. There was considerable primary bleeding in 9 of his 38 cases, and a greater secondary in 4. This occurs more freely the nearer the wound comes to the neck of the bladder.

The bladder-wall he divides at once—not in layers. In but one case—where there was a large imbedded calculus—did he intentionally crush the stone before removal. Two drains are put in, one for the bladder, the other for the prevesical space. Suture of the bladder he has not practised. The patient is afterwards kept strictly on the belly the hands and feet being usually tied to the bed until the narcosis passes off. This position is well tolerated. Every two or three hours the drains are inspected, and in dorsal decubitus the bladder washed out with boric solution. If all goes well these washings are done less often after the second day, and after removal of the drains on the fourth or fifth day entirely stopped. Towards the end of the first week the belly position is changed for a while and in a few days quite given up. About this time urine begins to be passed by the urethra.

From 1870 to 1877, *i. e.*, before cleanliness, general antiseptis, drainage and belly position had been introduced, but 8 out of 18 recovered. Though two of these deaths were not directly attributed to the operation, still the mortality was 50%. From 1877 to 1881 the method was rejected. Since then he has used it again, after newer methods, in 20 cases with 4 deaths, or only 20% mortality. This he shows to be about the general average. Neither the condition of the child or that of the bladder and urine proved at all indicative of the result. However, very young children and relatively very large calculi were unfavorable. Of 8 patients, from 7 to 12 years of age, but one died. The causes of death were: septicæmia without peritonitis (5), septicæmia with peritonitis (7), pyonephritis (1), and catarrhal pneumonia (1, death after 51 days). Twice the peritoneum was opened once with a fatal result.

The details of his 38 cases are presented in tables. In discussing cystorrhaphy after this operation he cites 55 cases from various sources with 8 deaths or 14.5%, besides others in which the termination was not given. From this he is inclined to take a more favorable view of this procedure than earlier statistics bearing thereon seemed to warrant. Especially favorable were those cases in which permanent catheterization was carried out.

In an added note three later cases are given, with one death five and a half weeks later. In the two recoveries the bladder wound was sutured, but the sutures did not hold.

#### MEDIAN LITHOTOMY.

This method has not been practiced much in Russia—in only 20 previous cases. To these he adds 15 of his own. One was a child of 18 months, and successful, death resulting from a scarlatinal complication thirty days later.

He dilates the prostatic urethra with the finger. Only once was it necessary to make a nick in the bladder neck. From late troublesome retention in his first case he has since inserted a drain either quite into the bladder or to its mouth. This stays for only one to three days.

Of these 15 patients only 2 died from the operation and a third thirty days p. o. from scarlatina. This leaves a mortality of 14.3%. In 2 cases a fistula remained, one of them being operated therefor two years and a half later. Faulty continence of the urine lasted for months in four; in three of these it persisted for years, though in two only as nocturnal enuresis. This undesirable sequel was independent of the difficulty of the operation.

As soon as the external wound begins to cicatrize and continence has been regained he recommends at each urination that the parts around the opening be held together by thumb and index so as to prevent a single drop passing through the urethral wound. A sixteenth case, with cure, is added in an appendix. He favors this method where the calculus is small and the child 8 years old or over.

## LATERAL LITHOTOMY.

This was practiced in 13 cases, with 4 deaths, though two were not directly in consequence of the operation. The patients' ages ranged from 4 to 11 years. Here also he uses drainage that he may apply local treatment to the always present vesical catarrh. In 3 there was considerable primary hæmorrhage. In no case did a fistula result. All the deaths were in the pre-antiseptic period. The average mortality is about 7%, whilst in his cases (2 in 11) it was over 18%.

## LITHOTRIPSY.

Of this there were 18 cases, including three girls, the patients' ages ranging from 3 to 12 years. The number of sittings varied from one to eighteen. In 8 cases even repeated sittings caused no reaction. In only 5 cases could a complete cure be asserted. In 5 cases fragments had to be removed instrumentally after lodging in the urethra; in one even forced dilatation of the external orifice, later external urethrotomy, and finally circumcision of the œdematous prepuce were necessary. In 6 cases cutting operations had still to be resorted to, with 3 deaths. In 2 cases a relapse in after years was treated by cutting.

From the lithotripsy itself there were two deaths (11.4%). Hence he concludes with other writers that this method is only exceptionally permissible in children, as, *e. g.*, where cutting operations are not consented to, in small phosphatic calculi (if such close diagnosis be possible), and in females.—*Arch. f. klin. Chirg.*

WM. BROWNING (Brooklyn).

**VI. On the Diagnosis and Operative Treatment of Tumors of the Urinary Bladder.** By Dr. H. KUEMMELL (Hamburg). The primary neoplasms of the bladder develop either from the prostate as fibro-adenoma, myoma and carcinoma, or from the different layers of tissue composing the bladder walls, namely the mucous, submucous, muscular tissues, or the epithelium, respectively glandular structures of the bladder. The papilloma or fibroma papillare, the most frequent of all bladder tumors, have the greatest interest for the surgeon. They belong to the last named group and are usually found



in the fundus, the trigonum, in the neighborhood of the mouths of the ureters, and the lateral walls of the bladder. We find them more frequently in males than in females. Fibrous polypi and myoma are generally met with in children, the latter especially in female children. Hæmorrhage from the bladder, sudden and unexpected, is the first and most important symptom pointing to the existence of a tumor in this organ. Hæmorrhages from the urethra, consequent to traumata of various kinds (introduction of sounds, etc.), is characterized by the appearance of some drops of blood or some blood coagulum, this being followed by a stream of clear urine. In hæmorrhages from the kidney or its pelvis the urine and blood are evenly mixed. In cases of tumors of the bladder, on the contrary, the stream of urine is at first quite clear or but very slightly tinged with blood; finally, however, it becomes one of almost pure blood. Another symptom is the frequent desire to urinate; pains and drawing sensations in the urethra, perineum and anus follow. These latter are, however, more apt to occur in cases of malignant tumors. Catarrh of the bladder sets in, in many cases undoubtedly caused by the necessary and frequent introduction of catheters, sounds, etc. The diagnosis may be, furthermore, assured by the detection and microscopical examination of particles of tumor. In females the diagnosis will be easy and certain, but in men this is much more difficult. A combined examination, in the latter cases, through the abdomen and rectum; examination furthermore with the catheter, will be found necessary. Küster's instrument, consisting of a catheter, having a sharp-edged, oval-shaped opening on its convex side, for bringing away portions of the neoplasm, is useful. In endoscopy we have, moreover, a diagnostic means at our disposal, which has proved itself valuable in a number of cases.

Direct digital exploration of the bladder is, however, the most reliable means for diagnosis. In women this is comparatively easily accomplished, but in male subjects it is only possible by means of the boutonniere, external urethrotomy.

There are various methods of removing such tumors, and the choice of them must depend on the position, size and other conditions of the tumor. Small growths with long pedicles, in women, may be removed



through the dilated urethra, with properly constructed forceps or by means of the galvano-cautery or wire snare. Colpocystotomy, as introduced by Simon, the author recommends highly, when the tumors are not too large and the vagina not too small.

In cases of large tumors, and where these may not be reached in the above named manner, owing either to their position or extensive growth, the author recommends suprapubic cystotomy as the most rational and certain method of removal. In male patients the choice would lie between the *sectio mediana* and the *sectio alta*. Thomson prefers the former, whilst Guyon has adopted the latter method entirely. The author, however, is of the opinion that a certain and thorough removal of all such tumors, especially benignant growths, is only possible by means of the *sectio alta*. This affords a clear and unobstructed view into the interior of the bladder, and small growths can be detected and removed. Large ones are only removable in this manner.

Küster's method of excising that portion of the mucous membrane to which the neoplasm is attached, and closing the wound with catgut sutures, is the best and most radical. The author closes the bladder after the operation, using several rows of catgut sutures, the first uniting the mucosa, the second the muscularis, the third the more external tissues. The cutis is only united at the upper end of the wound to prevent a prolapse of the intestines. The remaining portion of the wound is plugged with iodoform gauze. He regards this method of procedure as the best, and he never had any disagreeable results in his own cases. The catheter is allowed to remain in the bladder.

In conclusion Kümmell gives the history of the following cases:

The first case was one of papilloma of the bladder in a male patient *æt.* 31. Suprapubic cystotomy; excision of the tumor; wound closed as above described. Catheter was removed, by mistake, on 30th day, causing a small fistula to form in the wound. Catheter removed. Fistula healed in fourteen days. Recovery in five weeks.

The second case was that of a woman, unmarried, *æt.* 40. Papilloma of the posterior wall of the bladder. Colpocystotomy of tumor; suture of the mucous membrane; recovery.

In the third case the patient was 70 years old, with an adenoma of the prostate. Sectio alta; removal of the tumor with Paquelin cautery; suture of the bladder, etc., as above described. Catheter changed at times. Irrigation of bladder every day. Wound healed in ten days. Severe catarrh of the urethra set in, causing probably the subsequent epididymitis. Abscesses of the scrotal tissues followed, but healed quickly after incision. Patient was up four weeks after operation. Complete recovery excepting a slight catarrh of the bladder.—*Deutsch. Med. Wochens.*, No. 7., Feb. 14, 1887.

C. J. COLLES. (New York).

**V. Fibroma of the Epididymis.** By M. PONCET (Lyons). An unusually large example of this rare disease occurred in the case of a man æt. 57, admitted into the Hotel Dieu at Lyons. During the time he had noticed its existence, about five months, it had grown rapidly and was the size of child's head. Nevertheless testicular sensation could still be attained in front of the swelling, and there were no adhesions to the scrotum. Beyond the history of a blow on the part some two years previously there was nothing to point to any cause. Castration was performed with a good result. The tumor, which was shown to be a pure fibroma, had started in the globus minor, it weighed no less than two and half pounds. (*Gazette des Hopitaux*, May 14, 1887.

Most of the cases of true fibroma in this region (from which, of course, the "recent fibroid" or sarcoma must be carefully distinguished) have occurred in elderly patients, Thos. C. Heath (Path. Trans., xvi, p. 183) records a precisely similar case to the above in a man æt. 56, and W. Harvard (ibid, vol. xxiii, p. 168) and connected with the tunica albuginea in a patient æt. 81. The enormous size to which some fibromata within the scrotum attain is exemplified by cases recorded by Paget (Surgical Pathology, p. 464) in which the tumor weighed twenty pounds, and by Lesavanges in which it reached forty-four pounds. Both were in patients of very advanced age.

J. HUTCHINSON JR., (London).

**Removal of an Enormous Calculus from the Pelvis of**  
By FRANCIS J. SHEPHERD, M.D., (Montreal). A man,

æt. 26, had been suffering from renal pain for seven years, with no tumor and pus in the urine varying from a mere trace to 25%. An exploratory incision was made in the left loin, and division of the renal substance showed an enormous unbreakable stone of triple phosphate, which was removed with considerable difficulty; it was 4 ounces 7 drachms in weight, and measured  $3\frac{1}{2}$  inches in length and 9 inches in circumference, and is apparently the largest renal calculus yet removed by lumbar section; a small projection which was broken off in removing the stone, was extracted without difficulty. The tissue of the lower part of the kidney exposed seemed healthy and no pus was evacuated, for which reason it was thought best not to remove the viscus. The patient rallied from the operation, but the wound continued to discharge pus in varying quantities, and the temperature suffered corresponding variations, until three months and a half after the operation he was seized with septicæmic symptoms which resulted in death. The autopsy showed that the upper part of the kidney, which was not exposed, consisted of a series of large communicating sacs containing over 10 ounces of foetid pus; these cavities did not connect with the lumbar sinus or the pelvis of the kidney, and contained a number of irregular branched calculi, varying in size from a bean to a walnut. The fatal result was undoubtedly due to septicæmia from these abscesses, and the case teaches the uselessness of expecting to have a kidney which has not undergone grave changes in case of a large stone and that thorough exploration is demanded in all cases and extirpation in most of them.—*Med. News*, April 23, 1887.

**VII. A Case of Nephrolithotomy During the Fifth Month of Pregnancy.** By LOUIS McLANE TIFFANY, M.D., (Baltimore). A woman, æt. 27, with a history of lumbar pains for several years, with at times small quantities of pus in the urine, experienced a fall which occasioned great pain in the loins, being then three months advanced in pregnancy; the pain continued to increase during the ensuing two months, and during the last seven weeks, dating from the patient's attendance upon a fall, there was lumbar hyperæsthesia which extended also over the left half of the abdomen and the urine was offensive and purulent. No tumor could be found in the loin, and pyelitis, probably

from renal calculus, having been diagnosed, the kidney was exposed by lumbar incision. On dividing the kidney tissue an abscess was opened which the writer believes to have been formed in a Malpighian pyramid, the outlet of which was closed by the stone lodged in a calyx. Further incision exposed a calcium oxalate stone, weighing 30 grains and shaped somewhat like a cocked hat; it was easily extracted, the wound irrigated with a 1-4000 sublimate solution, a large drainage tube inserted into the pelvis of the kidney, and an iodoform dressing applied. The patient made a good recovery and there was apparently no disturbance of gestation.—*Med. News*, April 16, 1887.

**VIII. Digital Exploration of the Kidneys.** By WILLIAM T. BELFIELD, M.D., (Chicago). The author calls attention to the fact that the greatest obstacle to the early surgical treatment of renal lesions has been faulty diagnosis, and summarizes as follows: (1) Surgical affections of the kidney are frequently long masked by symptoms of cystitis, etc.; differential diagnosis may be practically impossible without palpation of the kidney. (2) Digital exploration of the kidney through a lumbar incision is, with proper precautions, almost free from danger, comparing favorably with perineal exploration of the bladder. (3) This operation, performed at an early period, may arrest a morbid process which would otherwise require nephrectomy; even if it secures no other immediate results than accurate diagnosis, it diminishes the danger from subsequent nephrectomy. (4) Before undertaking to incise the pelvis, the functional activity of the other kidney should be demonstrated by examination of its secretion.—*N. Y. Med. Rec.*, May 14, 1887.

**IX. Stab Wound of the Kidney; Recovery.** By FRANK [unclear], M.D., (New York). A man, æt. 25, was stabbed with a [unclear] or's knife, receiving a wound an inch and a half long on the [unclear], between the ninth and tenth ribs, midway between the mammary axillary lines, from which blood flowed continuously. He [unclear] from severe shock, his pulse was rapid and feeble, and [unclear] was cold, although he was conscious; the wound and sur-

rounding parts were immediately disinfected with 1-1000 sublimate solution and, four hours later, his condition having somewhat improved, he was anæsthetized and the wound enlarged sufficiently to admit the hand, by an incision downward and slightly forward; the ascending part of the transverse colon could now be seen. The hand was passed through the wound and entered the peritoneal cavity, where it distinctly felt the liver, the gall-bladder and the transverse and ascending colon, all uninjured. On continued examination with the hand, a cut was discovered in the right kidney about two and a half inches long, running from its outer to its inner border and passing completely through its substance; three fingers were passed into this wound and the calices were distinctly felt along the inner border of the kidney, one of them appearing to be completely severed. On account of the profuse hæmorrhage, the severe shock and the opening into the peritoneal cavity, it was thought advisable not to perform nephrotomy, which would have required much time, increased the already existing shock, and doubtless favored a fatal termination. It was therefore considered more prudent to control the hæmorrhage, provide a free exit for the subsequent discharge of urine, and shut off the peritoneal cavity from infection; accordingly, the wound was carefully washed out with a warm boro-salicylic solution; two drainage tubes were inserted at the upper and lower angles of the wound, a third drainage tube being passed directly into the kidney to its inner border, and all were fastened to the skin with catgut sutures. The patient was then placed upon his side and the wound again thoroughly cleansed with the same solution. The peritoneal cavity was closed off from the retroperitoneal cavity as completely as possible by packing iodoform gauze in the wound, allowing the ends of the gauze to hang outside; when this was thought to be certainly accomplished, the wound was itself packed in the same way down to the kidney, and was partially closed with catgut sutures, and an iodoform and sublimate dressing applied over all. The patient did well and was discharged from the hospital six months later with the wound entirely healed except a sinus leading to the kidney, through which a small amount of urine escaped. A month after this he had completely recovered.—*N. Y. Clinical Society*, March 25, 1887.

JAMES E. PILCHER (U. S. Army).



## TUMORS.

**I. On Tumors of the Bursæ.** By Prof. H. R. RANKE (Groningen). Although the pathology and anatomy of the bursæ have been developed in several directions and by a goodly number of recognized authorities, yet our knowledge of tumors of this structure is still very deficient. Many cases of so-called tumors are known, but if we exclude all pseudo forms, neoplasms in the strictly scientific sense are rare. Perhaps not more than half a dozen cases are known. Most of the so-called tumors were the result of chronic inflammation (indurating, fibrinous, hæmorrhagic), of alteration in the contents of old hygromata (as, *e. g.*, calcification) or had arisen from operative cicatrices. Only in the International Cyclopedia of Surgery (Nancrede's article) does he find true bursal tumors fully separated. Only two such are there given, a third questionable one R. shows to have been of another nature. A third tumor (from the olecranon bursa) since observed by Nancrede is known to R. only by letter. Two new cases form the basis of his article.

(1) Myxoma of left prepatellar region, originating in a hygroma. The patient, a farmer æt. 63 years, was admitted with a large partially ulcerating tumor in front of the left knee. It secreted a considerable quantity of stinking serous fluid. A firm, round painless enlargement had been first noticed two years before. Repeated contusions were given as the cause. Nine months later this was nearly cured by compression but soon relapsed and would not again yield to such methods. Aspiration gave but temporary benefit. Patient then broke it, bloody stinking pus coming away. After this the growth increased more rapidly. Several pus-secreting openings formed and hæmorrhages occurred, finally followed by loss of flesh, evening fever and an obstinate dysenteric trouble. The use of the leg was, however, not greatly interfered

The tumor was 20 ctm. long, 18 ctm. broad and 62 ctm. in circumference. It was easily displaceable laterally, less so vertically.

The skin was adherent, coursed by large veins and perforated by fungus-like granulations bleeding freely on the slightest provocation. Patient consented to extirpation not amputation. It was separated from common extensor, periosteum of patella, and ligamen-



tum patellæ with comparative ease and without opening the knee. Some sixty vessels had to be ligated and a large skin-defect remained. The fever soon abated and temporary improvement followed. Death from pneumonia in two weeks. No metastasis. The growth probably originated from hygroma of the middle bursa.

(2) Hæmorrhagic sarcoma of right extensor bursa, first diagnosed as chronic hæmorrhagic inflammation. Incision; scraping; drainage; temporary cure. Relapse resp. transformation of the inflammatory neoplasm into a tumor. Extirpation. Cure.

Healthy man, æt. 20 years. For a year a slightly painful enlargement of unknown origin above the left patella. Local applications did not seem to affect it. Presently increased growth. On incision the examining finger passed into a cavity beneath the end of the quadriceps, surrounded by soft parts, and apparently filled with a mixture of fluid and coagulated blood and muco-synovia like solution. From its walls projected soft masses like fungoid granulations and giving rise to free venous hæmorrhage. The cavity was scraped and washed out. Drainage. Permanent dressing. On removing the drain fourteen days later only a small doughy swelling remained. After two weeks under a protective dressing this had rather increased. A knee-compress seemed to stop further enlargement for three months. Then it rapidly grew to a larger size than before. The knee could scarcely be flexed to a right angle. The cicatrix at former opening was transformed into a bluish red soft prominence on pressure evidently disgoring its fluid contents into the chief tumor. This time the tumor with capsule and cicatrix was prepared out. The periosteum of the femur and the joint-cavity remained intact. No bursa was now to be found between bone and muscle, hence the bursa under the common extensor must have been the seat of the trouble. Fortunately no union with the joint existed. The patient has remained healthy; flexion is not greatly impaired.

As a third case he relates that of a simple angioma originating in the cicatrix of an old obliterated præpatellar hygroma. Extirpation. Cure.

Short abstracts of four other published cases and one communicated to him by Mikulicz are added, making with his two a total of seven.

These cases represent two classes ; one where the bursal wall is transformed into some structure allied to connective tissues as chondroma, sarcoma, myxoma, etc. ; the other, epithelial neoplasms, as yet only observed where fistula was present.

It is doubtful if a normal bursa is ever the starting point of these new growths.—*Arch. f. klin. Chirg.*, 1886, Bd. 33, Hft., ii.

W. BROWNING (Brooklyn).

## II. On Subdiaphragmatic Cydatids and their Treatment.

By Dr. LEOPOLD LANDAU (Berlin). Hydatid cysts springing from the upper surface of the liver naturally press upwards into the thorax, displacing the heart and lungs. The diaphragm offers less resistance than the anterior abdominal walls. From time to time cases have been recorded which caused pleurisy, atelectasis pulmonum, empyema and pyopneumothorax and various operative measures, such as blind tapping and resection of the ribs have been undertaken with small amount of success. Dr. Landau's method of obtaining access to deeply seated cysts between the liver and diaphragm is shortly as follows: Having determined by repeated punctures that the cyst lay on the convex surface of the liver an incision was made in the *liniæ alba* from three fingers' breadth above the umbilicus to the ensiform cartilage. As the liver surface which presented was of the natural colour the finger was passed upwards and the organ drawn down and anteverted. Two sutures having been passed through liver substance, peritoneum and abdominal walls at the angles of the wound were given to an assistant to hold. Diëulafoy's needle being again used the cyst was found to tend chiefly to the upper surface of the left lobe, so a small incision was made through the liver substance upwards and to the left. The result was that a large quantity of cysts were forcibly ejected from the upper angle of the wound. The bent forefinger was then insinuated into the sac clearing out a number of daughter cysts. The upper wall of the cyst was found to be firmly united with the diaphragm, the cardiac impulse being plainly felt. The edges of the incised liver were then united with those of the abdominal walls, and the cavity washed out with sublimate solution (1 in 5,000), and three large drainage tubes inserted. The sutures were removed on the

eighth day. The tubes were not changed for 38 days, when the sound showed that the cavity had shrunk from the size of a child's head to that of a hen's egg. Eleven weeks after the operation the wound was closed.

The cavity was never once irrigated after the operation. The woman bore children after, and a year after the liver was not connected with the scar. The hepatic dulness was also normal.

Israel practised an operation in which having first excised the ribs and obtained closure of the lower part of the pleural cavity, he then incised the parent cyst through the diaphragm. This operation is obviously impossible in such a case as the one detailed where the sac lay next the heart and must be full of dangers in any case. The last four cases operated on by Dr. Landau were never once irrigated and practically never suppurred, only discharging a slimy, serous fluid.—*Deut. Med. Ztg.*, 1886, Nos. 93, 97, 98.

**III. On the Treatment of Nævus by Excision.** By R. W. PARKER. The author states that excision is most widely applicable of any of the methods of treating navus. For cutaneous nævi there is no better application than fuming nitric acid; subcutaneous ligature is regarded as a barbarous practice; the plan of injecting nævi is generally unsatisfactory and occasionally fatal. Electrolysis is useful in cases of soft semi-cavernous nævi. The steps in operating by excision adopted by the author are shortly as follows: Elliptical incision through skin and subcutaneous tissue, detachment of edge, shelling out till the nutrient vessels are reached, which are threaded with catgut, the wound edges are carefully adjusted with catgut sutures, painted with iodoformed collodion and a dry dressing applied.

In the case described "there was, unfortunately, not much primary union," probably, we venture to think, because no catgut drainage and a reliable antiseptic was used. The author notes the following points: "The fact, though not a new fact, is remarkable."

Spontaneous ulceration is a rare occurrence. Spontaneous cure has never been observed.

# THE MANAGEMENT AND TREATMENT OF UMBILICAL HERNIÆ.

By C. B. KEETLEY, F.R.C.S.,

OF LONDON.

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## ARGUMENT.

*The doctrine that appliances are contra-indicated in the case of male children with umbilical herniæ, not founded on facts.—It is not necessary to have truss pads made flat.—Operation for radical cure sometimes justifiable even for congenital umbilical herniæ in childhood.—How the operation can be done successfully and safely.—Excision of the sac unnecessary.—Difficulty of separating the sac from the skin at one part of the navel.—Umbilical herniæ in adults, often complicated and distressing.—Total or partial irreducibility very frequent.—The sufferers usually wear only very imperfectly-acting belts.—They object to trusses.—Value of diet, especially of the “Banting system” in these cases.—Operation for radical cure, its dangers are not, strictly speaking, due to the operation, but they ought not to be slighted.*

ALMOST all umbilical herniæ make their first appearance either in earliest infancy or late in middle life.

A small minority of the umbilical herniæ seen in infants are herniæ into the stump of the umbilical cord, and are truly congenital; but the majority are not discovered by their parents until a week or two after birth, and therefore when the stump of the cord has withered up and left only the navel. But even this class of cases depend on a congenital defect. The aponeurotic layer of the abdominal wall must have been deficient. The ventral laminæ have probably failed to unite

completely at this part of the length of the linea alba. Although this failure takes place close to the navel in the vast majority of cases, yet it sometimes occurs much higher or even lower.

I shall, in this paper, confine my remarks entirely to the common form of umbilical hernia. Its diagnosis is obvious. What of its prognosis and treatment? They depend on each other.

When a student I was always taught that in male infants there is such a tendency to spontaneous recovery that a truss or belt and pad are superfluous, and, moreover, that there is a tendency to inguinal hernia which is liable to be increased by the use of any appliance pressing on the umbilicus.

Therefore I was told to leave umbilical herniæ of male infants to nature. On the other hand female infants were to be treated with a truss or belt and pad. I was also assured that, unless this pad were perfectly flat, it would enter the umbilical hernial opening and increase the size of it.

While I must acknowledge that all this sounds very reasonable and likely, I must add that I suspect it may, after all, be merely specious and based not on experience but on *a priori* considerations only.

For, over and over again, as the rule rather than as the exception, I have found that where both umbilical and inguinal herniæ occurred in the same infant, the inguinal had preceded the umbilical; and generally both had appeared before any form of truss had been applied to either.

Moreover, in female as well as in male children, there is a great tendency to spontaneous recovery.

I am not, therefore, inclined to take sex seriously into consideration in deciding on the question of a truss or belt.

Rather do I have regard to the presence or absence of signs of digestive disturbance and abdominal pain and discomfort. These are often associated with umbilical herniæ in childhood, and the surgeon can scarcely ignore them even if he would.

With regard to the shape of the pad, almost all those supplied by instrument makers are rounded rather than flat. I have never seen such enlarge the hernial aperture. As a matter of fact they seldom or never press into it. When the child



sits up or stands, the contents of the rupture tend to press the pad away from the opening. When the child lies down the pressure of the truss is relaxed by the position, unless the belt or spring is so tight as to be uncomfortable. Most trusses are tighter when the patient is upright than when he is horizontal. I am not defending distinctly conical pads, merely such as are gently rounded.

A point really of the first importance is to keep the pad in correct place immediately over the ring. To do this, good strapping is generally necessary, even though the pad be attached to an elastic belt.

*Is there ever justification for operating on children with umbilical hernia in order to obtain radical cure?* Not generally but sometimes undoubtedly.

In some of these cases the hernial aperture is so large that one can scarcely hope to see spontaneous cure ever take place, and the history may make it clear that the rupture has been getting worse rather than better, perhaps for years (for sometimes, although the rupture is congenital, the patient is an adolescent. I saw such a case recently and shall probably operate on it. She is, I am told, subject to attacks of colic and vomiting, which she herself and her friends attribute to the rupture. I have never seen her in one of these attacks myself, in fact saw her for the first time last week. But I am satisfied that her hernia can be cured radically and with safety; and considering her sex, the probability that she will marry some day, become pregnant, perhaps grow fat, while the rupture may increase to a dangerous as well as vexatious and distressing trouble—all these considerations impelled me to recommend an operation.

*How should one operate on umbilical hernia of infants?*

It is seldom if ever necessary to open the sac or the peritoneal cavity, and still less necessary to excise the sac. Of that I can give positive proof.

This is a consideration of first-class importance, calculated to go far to remove prejudice against and fear of the operation.

I have shown at the West London Medico-Chirurgical Society two infants in whom (at the West London Hospital, on



March 2, 1885, and March 11, 1886, respectively) I invaginated the sac, refreshed the edges of the hernial aperture and brought them together, in one case with catgut sutures, in the other with a hare-lip pin. In the former I also painted a concentrated decoction of oak bark over the sac, ring and neighborhood to excite a plastic effusion and reaction. Both cases were thoroughly successful. One was a very large hernia indeed. Both children ceased to suffer from abdominal pains and troubles, to which they had been previously subject.

In the case of two other children also treated in the West London Hospital, and operated on October 6, 1886, and January 31, 1887, respectively, I have tried a new plan, based on Macewen's operation for inguinal hernia.<sup>1</sup> Instead of simply

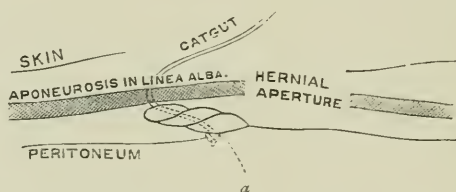


FIG. 1.—OPERATION FOR RADICAL CURE OF UMBILICAL HERNIA.  
Longitudinal section.

*a.* Sac twisted and reduced "*en masse*" between peritoneum and aponeurosis.

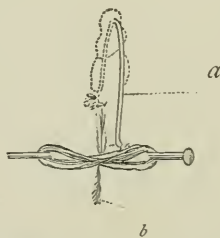


FIG. 2.—OPERATION FOR RADICAL CURE OF UMBILICAL  
HERNIA. Superior view.

*a.* Catgut fixing sac, and secured to twisted suture. *b.* Aperture closed by strong hare-lip pin and twisted suture.

invaginating the sac and pushing it straight back into the abdominal cavity (merely turned inside out and unopened of

<sup>1</sup>See ANNALS OF SURGERY, Vol. IV., p. 88.

course). I, in the two latter cases, gently twisted the sac, passed a stout catgut ligature in and out through it, very carefully separated the peritoneum from the linea alba above the hernial aperture, passed a needle up into the artificial space thus made, with this needle carried the catgut (already threaded through the sac) into the space and out through the linea alba. Then, on pulling the catgut tight, the twisted sac was, of course, pulled into the space between the peritoneum and the linea alba, reduced "*en masse*" as it were. (See Figs. 1 and 2).

The manœuvre of twisting the neck of the sac was suggested as a substitute for ligature, by Dr. C. B. Ball, of Dublin.

The hernial aperture was then, of course, free and its edges had only to be refreshed and brought together with hare-lip pin and twisted catgut suture. The formerly mentioned catgut was fixed to the latter.

Both cases did perfectly well, excepting that one wound kept open and suppurated slightly for several weeks until the catgut suture came away. The other infant was able to bear a pad and sit up in a fortnight.

Will these cases ever relapse? I do not think so. Let us remember the natural tendency of umbilical herniæ to recover spontaneously when placed under favorable conditions, and surely these cases are now under such.

One thing might be urged against this plan of operation. There is always a point down towards the lower end of the sac where it blends with absolute intimacy with the skin of the navel. At this point I have never succeeded in separating the two. There consequently remains a little open passage at the lower extremity of each hernial aperture, otherwise closed. But this little opening has not in any of the four cases tended to get larger. It does not inconvenience the patient. It presents an impulse, but gives exit to no hernial tumor. I am content it to leave to time. Even when excising the sac this point presents just the same difficulty to the surgeon, and, as it is situated close to the very edge of the aperture and blended with it in fact, the effect of excising it is injurious to the neck of the sac, which one always desires to keep intact.

Passing now to adults with umbilical herniæ.

The great majority of sufferers are women, middle-aged or older. They are generally fat and have borne children. Although they form only a small proportion of the total number of cases which present themselves at a truss society or a hospital, they include a large proportion of the serious, difficult and deplorable cases. I scarcely know any other mild word than "deplorable" for the condition of a poor woman with half her small intestines habitually in the sac of an umbilical hernia. Many cases approaching to this and some worse come to the truss societies.

Total or partial reducibility, generally the latter, is very common in these cases, in which respect they contrast with the umbilical herniæ of infants.

The usual treatment is to fit on a pad or a plate or a bag, according to the size and condition of the protrusion and to keep them in place with either a truss spring or a broad webbing belt, elastic or otherwise.

Unless it is a member of your own household or an exceptionally intelligent, obedient and manageable patient, do not order a truss, that is to say, a steel spring. Sooner or later she will meet a friend who will persuade her to take to a belt. Almost all women of the working classes prefer belts. They are very easy to wear, are soft, and the wearer is often happily unconscious whether or not her belt and pad are doing her good. If they do not hurt her she thinks they are all right, is content and hopes for the best. No wonder, then, that there are so many large and only partially reducible umbilical herniæ. The immense discs or plates of some of these pads and trusses are not required by the size of the hernial aperture, which is generally not very large. They are given for two reasons, (1) because they save the trouble of finding and supplying a truss which will keep a pad of moderate size in place, and (2) because the patients enjoy the feeling of having their stomachs supported by a disc like a dinner plate or a saucepan lid.

In truth most of these patients desire only to be made comfortable; they do not in the least understand the exact nature of the dangers to which they are exposed, and, though it would be easy to frighten them, it is practically vain to attempt to enlighten them.

Unless, therefore, I have to deal with an exceptional patient, I order a belt and a pad, and teach the patient how to keep the belt in position.

When the hernia is irreducible, if it be small I order a hollow pad, moulded, but if it be large, a bag to lace up. Many patients are, however, used to the hollow "sauce-pan lid" as we may call it, and go about with their irreducible herniæ lying in a kind of concave nest which it makes for itself in the surface of a flabby abdomen, being pressed thereto by the huge concave plate.

Great are the sufferings and dangers and miseries of many of these patients; but they are, according to my experience, seldom willing to be operated on for radical cure. But as I have often got them to temporarily entertain the idea, I suspect this reluctance to decide on submitting to the operation may be partly due to two things. (1) I have seldom strongly urged the operation and have rather overstated than understated its dangers; (2) the worst of these cases can get so much benefit from diet, especially from the Banting system. This probably acts chiefly by reducing the fat in the omentum, mesentery and about the abdominal viscera. It should be urged on all stout people with hernia and the majority of people with umbilical hernia are stout. I got the idea first from Banting's own pamphlet. He says his umbilical hernia disappeared while he was under treatment.

*But what about the question of radical cure?*

Sincerely, I firmly believe that the vast majority of cases of umbilical hernia which I have seen, could be cured without any danger from the operation. Would there have been no danger whatever then? Yes, there would have been danger from the operator, from his assistants, from the nurses, from the patient herself. These dangers are real, though I hope and believe that they are diminishing every day.

Such dangers are quite microscopic when an operation is done with only one simple instrument like a knife or chisel, and when no one's finger, not even the surgeon's own, touch the wound, when also only one dressing is applied and even drainage superfluous. Hence the safety of tenotomy. Hence, also, that of osteotomy, for which all that is required to en-

sure success is found in a careful surgeon, experienced in antiseptics and moderately practised in osteotomy.

But the radical cure of a hernia with excision of the sac and perhaps of a large quantity of omentum, with separation of adhesions, perhaps the insertion of many sutures and ligatures, some of which may have to be reduced into the peritoneal cavity, this is a very different matter. It must not be hurried. That would be to make failure sure. It may last a couple of hours. During all that time several individuals have to share responsibility and keep up a sustained vigilance. However watchful over his subordinates the surgeon may be, he can scarcely follow their every movement, and attend to his own business at the same time.

Many sponges pass to and fro again and again, and various instruments, some not so simple as a plain and polished knife edge.

Of course this style of reasoning might be employed to prove a trip in a steamboat from Westminster to Blackfriars to be fraught with danger. But, on the other hand, steam navigation is much older than antiseptic surgery.

However, just as steam navigation can be and is made safe enough for all practical purposes, so can be the radical cure of an irreducible umbilical hernia in a fat, middle-aged woman. But in order to make it safe it is essential to approach it with the greatest respect and the strongest sense of responsibility.

ON THE TREATMENT OF OLD DISLOCATIONS  
OF THE ELBOW.<sup>1</sup>

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THE great extension given in the last few years to the application of operative methods to the treatment of surgical diseases and injuries has compelled a reopening of many questions which had been previously looked upon as settled, and has made it necessary again to collect and study the recorded experience for our guidance in the future.

Among these questions, that relating to the propriety of interference in old, unreduced dislocations is an important one, and one upon which experience is rapidly accumulating, and among these dislocations, those of the elbow have an important place. The loss of mobility resulting from the injury, especially in the common dislocation of both bones backward, is usually so great that the disability is serious, the patient is unable to bring the hand to the head or chest, and is able to use it only in the arc of a circle whose radius is nearly equal to the length of the extended limb, and he may in addition possess only such rotation as can be effected by movements at the shoulder. Moreover, the injury is most common in the young, and the disability, therefore, is life-long. I desire to present to the society a brief review of a personal case, in which features of interest and importance appear, and a survey of the recent experience of others.

My case is as follows :

Maggie F., a rather delicate-looking girl æt. 11 years, was admitted to the Bellevue Hospital in April, 1886, with a backward dislocation of both bones of the right forearm, which had been produced five months previously by a fall from a sofa. The elbow was flexed at an angle of 150°, and was immovable, with the exception of some rotation. The soft parts covering the joint were normal in appearance and to the

<sup>1</sup>Read before the New York Surgical Society, March 9, 1887.



touch, and it was possible to recognize by palpation the relations of the bones, and that the internal epicondyle was lacking, while the external condyle was greatly thickened posteriorly, overlapping the concave surface of the head of the radius. The length of time that had elapsed since the injury was received, the extensive new formation of bone, and the degree of the disability, led me to attempt to relieve the condition by an arthrotomy. Dr. McBurney and Dr. Halsted were present and assisted at the operation. An incision was begun on the outer aspect of the arm about two inches above the epicondyle, was carried down to and a little beyond the latter, and was continued for a short distance along the forearm, parallel to and a little in front of the radius, and through this the mass of bone of new formation on the back of the external condyle was freely exposed and chiseled away. This mass grew backward and downward from the upper portion of the posterior aspect of the external condyle and the shaft above it, completely overlapping posteriorly the head of the radius in the form of a buttress, against which the latter rested, and was continuous on its outer and inferior margins with the condensed soft parts which formed the new capsule. The anterior part of the capsule, which was drawn snugly around the lower end of the humerus, and easily separated from it, and the articular cartilage of the latter appeared smooth and unaltered, but the dissection behind the humerus was made very difficult by the interposition of a mass of fibrous tissue between it and the greater sigmoid cavity, which entirely filled, and was closely adherent to, the latter. Dr. McBurney advised the making of a second incision upon the inner side of the elbow to facilitate this dissection, but, unfortunately, I preferred to meet the difficulty by dividing the olecranon, being encouraged so to do by the reports of some cases to be subsequently mentioned, and by personal experience of the method in operations for tuberculous disease of the joint. So the incision was extended across the olecranon, and this process was divided obliquely at its thinnest part. The back of the condyles was then easily freed, and the epitrochlea was found to have been broken off and to have become reunited with the humerus at some distance above its normal position. The attached internal lateral ligament was then separated from it, and the bones were then readily brought into place. The coronoid process of the ulna had not been broken.

The olecranon was sutured with silk-worm gut. A drainage tube was placed behind the condyles through the external incision, the wound was closed, and the limb was placed in a splint with the elbow at an angle of  $145^{\circ}$ . It was possible to flex it to a right angle, but in that position the strain exerted by the triceps upon the olecranon was

so great as to endanger its reunion. As the history will show, in thus seeking to avoid failure of union, the occurrence of another and more serious accident, which I did not anticipate, was favored—recurrence of the dislocation. Two days later the dressings were changed and the limb was enveloped in plaster-of-Paris bandages. A week later a fenestrum was cut and the tube was removed; there was little or no supuration. During the following month I was absent from the city: on my return, the dressing was removed and the wound was found to be solidly healed, but the dislocation had recurred. A second operation was done three weeks later, two months after the first. A curved incision was made, its convexity upward, beginning just below the outer side of the head of the radius and crossing above the olecranon; the ulnar nerve was exposed and drawn aside, and the joint was opened by cutting through the triceps. The joint-surfaces were found to be almost denuded of cartilage and much changed in shape by bony and fibrous outgrowths at their borders; so I excised the lower end of the humerus and the head of the radius; the bone was much softer than usual. I enlarged the sigmoid cavity by scraping, and cut a notch in the lower end of the humerus to receive the olecranon; catgut drains were introduced. Close fibrous union of the former division of the olecranon was found. The wound healed without incident in thirteen days; passive motion was made for several weeks, and the patient left the hospital with flexion to within a right angle and almost complete extension, but, on looking her up in February, 1887, about seven months later, I found the joint completely ankylosed at a right angle. The only good results of the operation was an improvement in the attitude, and against that must be offset the loss of the slight amount of rotation that existed before the operation. There is still the possibility of restoring motion by another excision, but I advised the parents not to have that done at present.

The direct examination of the joint at the two operations disclosed several interesting features of which some are new and others have been before described, which bear directly upon the question of the best method of treatment. The extensive overgrowth of bone upon the back of the external condyle has not, I think, been observed, or at least reported, in any other case in which the dislocation had existed for only five months, and it is to be attributed, probably, to the stripping up of the periosteum. It may be remembered that a specimen of incomplete outward dislocation, in a child *æt.* 8

years, removed by excision and presented to the society, October 25, 1886, by Dr. Lange, showed a similar growth nearly half an inch broad, on the outer aspect of the external condyle—one probably produced in the same manner. Taken in connection with avulsion of the epitrochlea, which is common in lateral dislocations outward, but rare in backward ones, and the apparent integrity of at least the outer part of the anterior ligament, it suggests that the dislocation was produced not by the usual hyperextension of the elbow, but rather by a lateral outward flexion of the forearm, which tore off the epitrochlea, and was then followed by a twist, which carried the coronoid process backward past the trochlea, and then by a direct impulsion of the bones backward and upward. Displaced in this manner, it is easy to understand that the head of the radius should have stripped the external lateral ligament from its attachment to the condyle, and should have passed upward between the periosteum and the bone, leaving the former continuous more or less completely with the ligament, and itself remaining within the cavity thus formed. That the periosteum thus stripped up should so promptly have produced the mass of bone found above and behind the head of the radius is entirely in harmony with our experience. To this extent the case is exceptional; but other features are of more general occurrence, and may reasonably be looked for under like circumstances. The attitude of almost complete extension of the forearm is common, and the consequent overriding of the bones along the back of the humerus leads to the formation of new cicatricial bands between the olecranon and the humerus, and to the establishment of new attachments of the torn lateral ligaments so far above and behind the center of motion that almost no flexion is possible without their rupture or elongation, and the return of the bones to their place can be effected only after a far more extensive rupture of these soft parts than that which accompanied the dislocation. In attempting to rupture these bands by forced flexion, the forearm is used as a lever, the fulcrum of which is situated in the ulna below the coronoid process, and the rupturing strain is exerted through the olecranon upon the ligaments and adhesions connected with it, and it is not to be

wondered at that this process should so frequently have been broken in the manipulation. In the case which I have described, the middle and posterior portions of the internal lateral ligament apparently had not been ruptured, but had been torn away at their upper attachment, remaining continuous with the fragment of the epitrochlea, and, after this fragment had reunited with the humerus at a higher point, the ligament was as strong as it had ever been.

The filling of the greater sigmoid cavity by a mass of fibrous tissue, partly of new formation and partly furnished by the posterior portion of the capsule which slips in between it and the bone, appears to be of frequent occurrence; it has been encountered in several operations, and the union between this mass and the cartilage of incrustation was so firm in my case, as also in others, as to require the application of the edge of the knife for its removal. When present, it must be a serious, perhaps an insurmountable, obstacle to the restoration of the bones to their place by any method which does not directly provide for its removal. The adhesion of the anterior portion of the capsule to the cartilage covering the capitellum was but slight, and the cartilage itself was almost unaltered in appearance after the separation. The reason of this notable difference in the solidity of the adhesions contracted by the cartilage covering the greater sigmoid cavity and that covering the capitellum is not clear.

Another change peculiar to the young, which was present in only a slight degree if at all, in my case, is one which may so far alter the shape of the end of the humerus, and particularly of the capitellum, as to make it impossible to replace the radius and ulna, even after the removal of all obstacles arising from the change in the soft parts. This change, which has rarely been noted at the elbow, is of common occurrence at the knee in the subluxations following prolonged flexions of that joint. It consists in an exaggerated growth of the epiphysis consequent upon the withdrawal of the pressure normally exerted upon it by the opposing articular surfaces, and, as the conjugate cartilage of the capitellum runs obliquely from in front and above downward and backward, this growth takes place in a direction at right angles to that of this cartilage—

that is, downward and forward—and the capitellum subsequently forms an abnormally large hemispherical prominence on the anterior and lower part of the bone. The epiphysis of the trochlea is smaller than that of the capitellum, forming only a comparatively thin scale upon the surface, and there are no observations to show any inequality in its growth due to this cause. In the reported cases in which the capitellum was deformed, the ulna had remained more or less completely in contact with the trochlea, and consequently the factor of withdrawal of normal pressure did not exist for it. In Dr. Lange's specimen, above mentioned, the capitellum showed this enlargement very plainly, but the inner side of the trochlea was flattened.

Another change, which has been observed only in cases of displacement of very long standing, is elongation of the neck of the radius, and this also, I think, must be attributed to the same cause. Reported specimens, in which one or both changes have been observed, are those of Humphrey, Allen and R. W. Smith, but in none of them is it certain that the primary displacement was a traumatic dislocation. In Humphrey's case the lower part of the left ulna was lacking, evidently the result of defective development; the right ulna was firmly ankylosed to the humerus nearly at a right angle, and was eight inches long; its lower end was well formed, and was on the usual level with the radius. The latter was also eight inches long, and its head was displaced upward and rested against "the fore part of the ridge that ascends from the outer condyle to the shaft;" it was somewhat irregular in shape, and its extra length was developed in its shaft, and not in its neck, as in other cases. The displacement upward was clearly the result of the elongation of the radius, whatever the cause of the original displacement from contact with the capitulum may have been, whether traumatic, pathological or congenital.<sup>1</sup>

Allen's specimen was taken from the body of an elderly man, without a history. Both elbows were affected, flexion was normal, extension possible only to a right angle, rotation

<sup>1</sup>Humphrey, "Medico-chirurg. Trans.," vol. xiv, p. 296.



was entirely lost, the limbs being fixed in pronation. The radius crossed the front of the ulna and was united with it by bony union for a distance of about three inches at their upper part; below this part the shaft of the radius was much thickened. The neck of the radius was an inch and a half long, so that the head was carried well up behind the humerus on the inner side of the olecranon, and this overriding was further increased by the abnormal growth of the external condyle downward and outward, the extent downward of the growth being estimated at half an inch. The trochlear surface was deformed, mainly by the loss of its inner lip. The olecranon was so far filled up that the septum between it and the coronoid fossa was one-third of an inch thick.<sup>1</sup> In R. W. Smith's specimen, which was taken from a woman about 40 years old, the radius was displaced forward, and the external condyle was much larger than usual and was bent forward, its anterior upper surface forming with the lesser sigmoid cavity of the ulna, a deep hollow in which the head of the radius lay.<sup>2</sup>

Finally, partial fractures of the head of the radius and of the coronoid process have been observed in dislocations backward, and the presence of the fragment of the radius or the formation of bony union between the stump of the coronoid process and the humerus may interfere with reduction. In several cases the fracture of the head of the radius has caused so much disability that resort has been had to arthrotomy,<sup>3</sup> and in two cases of backward dislocation of both bones Annandale<sup>4</sup> found the coronoid process united to the back of the humerus "by a considerable amount of osseous material.

To recapitulate: In all cases of backward dislocation of both bones of the forearm, of more than a month's or six weeks' standing, it may be reasonably assumed that strong adhesions have formed between the olecranon and the stump of the external lateral ligament and the back and sides of the humerus, which must be ruptured or divided before the bones can be returned to their place, and that the greater sigmoid

<sup>1</sup>Allen, "Glasgow Med. Jour.," 1880, vol. xiv, p. 44.

<sup>2</sup>Smith, "Dublin Quart. Jour of Med. Sci.," 1850, vol. x, p. 213.

<sup>3</sup>Wagner, "Beilage zum Centralblatt f. Chirurgie," 1886, No. 24.

<sup>4</sup>Annandale, "Edinburgh Med. Jour.," February, 1885, p. 16.



cavity is occupied by a closely adherent mass of fibrous tissue; and when the patient is under 15 years of age it is probable that the lower end of the humerus has been altered in shape by the formation of new bone under the injured periosteum on its back or sides, and by the exaggerated growth of the capitellum. When the dislocation has lasted three months or more in a young patient, this deformity of the capitellum may be quite marked, and may be made still more important by an elongation of the neck of the radius. It is possible also, though not probable, that there may be present a partial fracture of the head of the radius or of the coronoid process, which will seriously interfere with the restoration of the functions of the joint even after the reduction of the dislocation.

Turning now to the bearing of these changes upon the question of treatment, it appears that they are clearly incompatible with successful reduction by the means employed in fresh cases, even if the force employed be sufficient to rupture the adhesions and to bring the bones down to the proper level. It is true that successes have been occasionally reported, but the reports rarely go beyond the statement that reduction was accomplished, and they leave the subsequent history of the case and the degree of re-establishment of the functions unrecorded. Until quite recently the only methods employed have been forcible attempts to reduce by traction and the breaking of adhesions, sometimes aided by subcutaneous division of the tendon of the triceps, or of the adhesions on the side and back of the joint, increase of the range of motion by the same means without reduction, reduction after fracture of the olecranon by forcible flexion, and excision of the joint.

Albert says that Liston, more than forty years ago, successfully reduced an old dislocation after having subcutaneously divided all tense bands, and that, in 1847, Blumhardt successfully practiced arthrotomy in a similar case, making two lateral incisions, and dividing through them all the adhesions that opposed reduction. This case appears to have been entirely lost sight of, and it was not until thirty years later (in 1877) that Küster,<sup>1</sup> in reporting a case of fracture and dislocation of the

<sup>1</sup>"Berliner klin. Wochenschrift," 1877, p. 16.

astragalus treated by excision, suggested that old dislocations of other joints might be successfully treated by arthrotomy. In the following year Trendelenburg,<sup>1</sup> in a paper recommending temporary division of the olecranon to facilitate operations upon the elbow joint, reported a case of incomplete outward, or outward and backward, dislocation of both bones, with avulsion of the epitrochlea, which he had treated by making an incision along the tendon of the biceps, and chiseling away enough bone from the lower end of the humerus in front of the coronoid process to allow flexion to a right angle; the result was good to that extent. A little later Volker<sup>2</sup> reported a case of incomplete outward dislocation of the left elbow, of six months' standing, in a boy, æt. 13 years, in which, after division of the olecranon, he had divided the adhesions, dissected away the new tissue adherent to the sigmoid fossa, and had then been able to reduce; as the change in the shape of the bones favored recurrence, he also removed the head of the radius. He then sutured the olecranon with two silk-worm gut sutures, passed from side to side of the bone, closed the wound and obtained a good result. His incision was V-shaped, its sides extending along the borders of the triceps, and the bottom of the V crossing the olecranon at the point where it was to be divided. The position of the limb (ankylosis in almost complete extension) and the evidences of serious pressure upon the ulnar nerve were important factors in the determination to operate. He was so pleased with the result that he looked forward with confidence to the adoption of the method in all old dislocations with much disability.

Trendelenburg<sup>3</sup> promptly claimed priority in the suggestion of preliminary division of the olecranon, and reported a case of backward dislocation of both bones of eight weeks' standing, successfully treated in this manner. His incision was a curved transverse one, the convexity directed upward, crossing the median line well above the olecranon, and the flap of skin was then dissected and reflected downward to the point at which the olecranon was to be divided; the division was done

<sup>1</sup>"Arch. f. klin. Chir." 1879, vol. xxiv, p. 790.

<sup>2</sup>"Deutsche Zeitschrift f. Chir." 1880, vol. 12, p. 541.

<sup>3</sup>"Centralblatt f. Chir." 1880, p. 833.

with a chisel. Because of difficulty in bringing the olecranon down, the limb was dressed in extension, but after the nineteenth day, when the wound was healed, the position was gradually changed, and four weeks after the operation the limb could be flexed to a right angle. The olecranon reunited solidly in this case and in Volker's.

In 1885, Nicoladoni<sup>1</sup> published a short paper on the application of arthrotomy to old dislocations of various joints, and included in it the report of two cases in which he had practiced it at the elbow. The first case was an almost complete outward dislocation of the left elbow, in a lad *æt.* 16, which had existed for eight months; the epitrochlea was broken off and drawn under the trochlea; the limb was in extension, flexion was almost entirely lost, but rotation was preserved. An incision 8 centimetres long was made in front, along the inner border of the trochlea, and through this the fractured epitrochlea was removed; a second incision of the same length was made on the outer side of the joint, through which, after removal of a small piece of bone which had been broken from the condyle, the soft parts were separated from the radius and the humerus; then, through a longitudinal cut made in the triceps, the adhesions between the olecranon and the back of the humerus were separated, and the bones were then easily restored to place. The wounds healed after slight suppuration; passive motion was begun after the third week, and the patient was dismissed after seven and a half weeks, with the elbow flexed and movable through an arc of  $35^{\circ}$  or  $40^{\circ}$ . Nine months later he wrote that he could flex and extend the joint freely, but that rotation was not quite so free. The second patient was a large, powerful man, *æt.* 41 years, with a backward dislocation that had existed for six months. The limb was almost completely extended and immovable: there was no passive rotation. Two lateral incisions, each 16 centimetres long, were made; through the first, over the outer condyle, in front of the head of the radius, the soft parts were separated from the bone, leaving the periosteum undisturbed, into the trochlea and above the fossa trochlearis in front and behind;

<sup>1</sup>"Wiener Med. Wochenschrift," 1885, p. 728.

the separation from the cartilage was easy in front, but very difficult behind. Through the second incision, on the inner side of the elbow, the flexor muscles were cut away close in front of the epitrochlea, and the separation of the soft parts from the bone was completed. The greater sigmoid cavity was found to be filled with hard cicatricial tissue, which was cut and scraped away, after separation of the posterior attachment of the orbicular ligament. Reduction was then easily made. Two drains were placed on the flexor side of the joint, and one through the tendon of the triceps; the wound was closely sutured, a Lister dressing was applied, and the limb was placed on a splint. Recovery took place without incident, and the patient was dismissed at the end of four weeks, the wounds being almost healed. There was good active rotation, but very little flexion; passively, there was complete extension and flexion to a right angle.

In drawing conclusions from this scanty record of only five cases, we may be somewhat aided by the results of similar operations at other joints, and in other dislocations at the elbow. In several (five or six) cases of isolated dislocation of the head of the radius, arthrotomy has been done with good results, both as regards the reduction of the dislocation and the restoration of function, although the latter has never been complete. I know of only one case (Burkhardt's) in which a dislocation at the shoulder has been reduced by arthrotomy, and in this the functional result left much to be desired. In another (Albert's) fracture of the surgical neck of the humerus took place during the operation, and the patient recovered with pseudarthrosis, and in a third (Thiersch's) the operation failed. At the ankle the astragalus has been successfully replaced by arthrotomy by Dr. McBurney, in a recent dislocation; and the operation has been done several times with success at the metacarpal joint of the thumb. In a case of thyroid dislocation of the hip, Polaillon<sup>1</sup> lost his patient by acute septicæmia. In a case of dorsal dislocation, of nine months' standing, in a child æt. 7 years, Dr. McBurney successfully reduced by arthrotomy, but the head of the femur subse-

<sup>1</sup>"Bull. de la soc. de chir.," 1873, p. 101.

quently became carious and was removed. The success in Volker's and Trendelenburg's cases in which the olecranon was divided, was fairly good, and the divided process reunited promptly and well; but in mine the union was only fibrous, and the fixation of the upper fragment was such that the limb had to be dressed in semi-extension, and to this I attribute the recurrence of the displacement. Probably the difficulty might have been avoided by a more free liberation of the upper fragment, from which I refrained because I did not think it necessary and did not anticipate the consequence which followed. The method gave easy access to the joint and a good view of the adhesions that needed to be divided; but in another case I should give the preference to the method by two lateral incisions, without division of the olecranon.

The only facts in this brief record that may actually contraindicate resort to arthrotomy are the death of Polaillon's patient, and the change in the articular cartilage observed at the second operation in my case. Of the former it is sufficient to say that the case was of six weeks' standing, and had been subjected to several attempts to reduce under chloroform, the last one three weeks before the operation, and that the region of the hip was still tender and swollen; the patient was delicate and alcoholic. The incision was made in front, from the anterior inferior spine of the ilium downward, and during the operation the dislocation was transformed into a dorsal one. Apparently, the operation was done with scrupulous attention to antiseptic details, and the occurrence of fatal acute septicæmia (with emphysematous gangrene) was probably due to extensive bruising and laceration of the soft parts; the record of the case indicates that the parallel between it and the operations upon tissues that have recently been subjected to violent traumatism is close.

The change in the articular cartilage observed in my case could hardly have been caused by the inflammatory reaction following the operation, for that was not sensibly greater or more prolonged than after the original dislocation. I am inclined to attribute it rather to the keeping of the knife too close to the bone in the separation and freeing of the soft parts, and I think, therefore, that in a similar case it would be



better to divide the adhesions than to separate them from the humerus. The reported cases are too few to justify much generalization, but the large measure of success which they have furnished is an encouragement to further trial. In the mean time the rules of conduct in the presence of old backward dislocation of the elbow formulated by Albert appear to be judicious. He says that in elderly patients he limits interference to rupture or subcutaneous division of the adhesions, and that, if reduction then fails, he forcibly flexes the elbow to a right angle, with or without fracture of the olecranon, and allows it to become ankylosed in that position. In younger patients he makes the attempt to reduce, sometimes dividing the tendon of the triceps, so as to avoid fracturing the olecranon; reduction failing, he does an arthrotomy, with two lateral incisions, and, if this also fails, he proceeds to resection.

To this I should wish to add the caution that arthrotomy should not be undertaken until after the tissues have entirely recovered from the inflammatory reaction or the fresh lacerations of the original injury, or of attempts to reduce; and that the longer the dislocation has lasted, and the younger the patient (under 15 years), the less is the probability that arthrotomy will be sufficient and the greater is the probability that excision will be required. In old, incomplete outward dislocations little good is to be hoped for from anything but arthrotomy, for the common interposition of the fractured epitrochlea cannot otherwise be overcome, or the cicatricial obstacles on the inner side be removed. The choice will, probably, lie between improving the attitude by forcible flexion of the limb, if extended, and arthrotomy, the internal incision being made in front of the trochlea, rather than upon the side.



# A FEW PRACTICAL POINTS IN THE SELECTION AND ADMINISTRATION OF ANÆSTHETICS.<sup>1</sup>

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**A**NALYSIS. (1) *The best method of administering nitrous oxide and ether in combination or succession; (2) the prevention of vomiting during or after the administration of an anæsthetic; (3) the danger of inducing general anæsthesia in patients suffering from obstructive dyspnoea; (4) the possibility of dangerous symptoms occurring from the exhibition of morphine or opium prior to the administration of ether or chloroform.*

(1) It is taken for granted that ether, preceded by nitrous oxide, is the best anæsthetic for the bulk of cases in general surgery. The preliminary administration of nitrous oxide is especially to be recommended in muscular, alcoholic, nervous or excitable patients. Atmospheric air should be rigidly excluded during the inhalation of the nitrous oxide; ether vapour should be *gradually and increasingly* admitted when the signs of nitrous oxide narcosis commence to appear; and, when much epileptiform movement occurs, a small quantity of air should be allowed. A portable apparatus, by which it is possible to administer these anæsthetics in the manner advised, is manufactured. The sudden transition from the inhalation of nitrous oxide to that of strong ether vapour is not desirable. By the above method, coughing, excitement, inhibition of breathing and struggling are prevented.

(2) Vomiting during the administration of an anæsthetic is usually to be prevented by rapidly and thoroughly anæsthetizing the patient, the diet having been previously regulated. Deep narcosis having once been established, reflex acts should be carefully watched for. Amongst these, deglutition is often

<sup>1</sup>An abstract of a paper read at the West London Medico-Chirurgical Society, May 5, 1887.

an important indicator of incipient coughing or vomiting, and if it occurred the administration should be pushed. The chances of vomiting after the administration can be lessened by the above means; in addition to this the swallowing of mucus or blood should be prevented by keeping the patient's head upon its side. The patient should be moved as little as possible after the operation. Experiments with cocaine (in aqueous solution administered before the operation) have been made, but it was difficult to say whether it had answered its purpose.

(3) It is questionable whether any anæsthetic should be given to patients suffering from obstructive dyspnœa. In a case in which a large innominate aneurysm pressed upon the trachea, and which was rapidly enlarging, an operation was decided upon. Previous experiment had shown that digital pressure upon the subclavian and carotid arteries did not materially increase the dyspnœa. Chloroform was cautiously given. After the ligature of the carotid the breathing became feeble, and, after the other artery had been tied, it ceased and could not be restored by artificial means. It was probable in this case that the nervous mechanism of respiration, doubtless somewhat exhausted before the operation, could not be sufficiently stimulated during anæsthetic sleep by the imperfectly oxygenated blood. Artificial respiration was ineffectual, although, before the operation, the chest and abdominal movements were perfectly competent to maintain the due oxygenation of the patient's blood. Another case of a similar nature and with an equally untoward result had been reported to the author; and in future he would certainly refrain from administering an anæsthetic to such patients.

(4) The sedative effects which opium or morphine exert upon the respiratory system should certainly contra-indicate their employment in cases in which respiratory embarrassment or failure would be likely to occur. Prof. Victor Horsley has advised the subcutaneous injection of morphine in cerebral surgery; and the injection of morphine with atropine before the administration of a general anæsthetic has been adopted by many surgeons upon the continent. The practice, however, was one which should be followed with the greatest caution; and in many cases altogether avoided. In illustration

of this may be cited the following remarkable case in which it seemed probable that the cessation of breathing which occurred was partly or wholly to be attributed to morphine thus administered. The patient was a young woman who presented unmistakable symptoms of a cerebral tumour in the cortex of the brain. When prepared for operation she was semi-comatose and hemiplegic; the corneal reflex was well marked; her pulse was 90, weak but regular; her respiration was feeble. A hypodermic injection of morphine was given, and the administration of the anæsthetic (a mixture of four parts of chloroform to one part of alcohol) was commenced with a Junker's inhaler. Very little of the anæsthetic was needed (one drachm throughout). As the operation proceeded respiration became more and more feeble and then ceased. It was restored by artificial means, but again ceased and was again restored. One hour and a quarter after the commencement of the operation it ceased for the third time and could not be made to return. Artificial respiration was then kept up (with occasional intermissions to see whether automatic breathing would return) for *four hours*, during which time the operation was successfully completed. After four hours, automatic breathing recommenced, but ceased not very long after (about two hours) and the patient died. The probable explanation to be given of such an occurrence is this: the respiratory nervous mechanism already much enfeebled, and possessing like the rest of the nervous tissues but a very limited store of energy, was rendered less capable of emitting those impulses upon which depended the respiratory movements of the patient, by reason of the sedative drug introduced into the system. There was no reason to accuse the anæsthetic; for the cessation of respiration was not like that observed in chloroform poisoning, and when artificial respiration has re-established automatic breathing in the latter condition recovery invariably ensues in the absence of complications. The manipulations to which the brain was subjected, or the loss of blood which necessarily took place might have exerted some influence; but from the general considerations of the case, and from the knowledge of the dangerous effects which morphine may produce in conditions of respiratory feebleness, the more reasonable explana-

tion of the symptoms is by the last named hypothesis. It is known that Cheyne-Stokes respiration can be brought about by giving morphine to etherized dogs, and this form of breathing is usually to be regarded as indicating a lessened irritability of the respiratory centres. It is therefore probable that a similar condition might be produced in human beings, and under certain circumstances might be so pronounced as to partially or completely paralyse the respiratory functions, Artificial respiration would probably be successful in such cases if preserved with for a sufficient length of time.

## EDITORIAL ARTICLES.

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### ON STIFFNESS AND TENDERNESS OF THE METACARPO-PHALANGEAL JOINT OF THE GREAT TOE, AND ON "HALLUX FLEXUS."

Attention has lately been called to this affection by Mr. Reginald Lucy, of Worcester,<sup>1</sup> since which many surgeons have hastened to express their views of it. Curiously, in the same number of the *British Medical Journal* which contained Mr. Lucy's communication, appeared an abstract of a paper by Mr. Davies-Colley on "Contraction of the Metatarso-Phalangeal Joint of the Great Toe." Some of the writers to subsequent numbers of the journal seem to assume that Mr. Lucy and Mr. Davies-Colley have described precisely identical conditions. That, however, is not the case, as may be easily seen on comparing the perfectly clear and even graphic descriptions given by Mr. Lucy with the equally distinct one by Mr. Davies-Colley. The former entitles his contribution "Stiffness of the Great Toe in Male Adolescents." His cases, he says, occurred in boys soon after puberty. The symptoms complained of were, pain in the metatarso-phalangeal joints of one or both great toes, with inability to dorsi-flex or hyper-extend the toe at the above joint, the attempt being accompanied by pain. The sufferers can flex the toe but cannot bend it upwards, and it remains stiff and fixed in a straight line with the sole. On manipulation of the affected toe or toes, there is pain referred to this joint, and some tenderness in the ball of the toe. No thickening of the joint ends or apparent hindrance to dorsi-flexion is present, while the other toes are painlessly mobile in both directions.

The patients are generally boys who have a great deal of walking and standing to do, with no history of injury, rheumatism or gout. An examination of their boots generally shows them to be short when the

<sup>1</sup>British Medical Journal, April 2, 1887.

weight of the body extends the foot longitudinally, while the vertical depth of the toe-cap appears to be less than the thickness of the terminal phalanges of the toe; the soles also were thick and stiff.

When one toe-joint is affected the patient limps in walking, dreading to raise himself on his toe, and so places the whole foot flat on the ground and lifts it again without bending it. But with the toes of both sides affected, the patient is crippled, and walks with great pain, after the manner of extreme double splay-foot. Errand and telegraph boys seem especially liable to this affection.

Mr. Davies-Colley describes<sup>1</sup> an affection which he terms "Contraction of the Metatarso-phalangeal Joint of the Great Toe." The abstract report given by the *British Medical Journal* states that Mr. Davies-Colley had been unable to find any description of this condition in surgical writings.

He had had five such cases under his care during the last nine years. The disease consisted simply of flexion of the first phalanx of the great toe through  $30^{\circ}$  to  $60^{\circ}$ , with extension of the second phalanx, and some swelling and stiffness of the metatarso-phalangeal joint. All the cases were in young men. It seemed probable that later in life the deformity tended to change to hallux valgus.

It is thus clear that Mr. Lucy is writing of a condition in which deformity is absent and Mr. Davies-Colley of one in which deformity is a striking feature. Mr. J. M. Cotterill<sup>2</sup> heads his contribution with the title of Mr. Lucy's paper and then devotes himself to critical remarks on Mr. Davies-Colley's, showing that the identity of the two conditions, or at least the fact that they are merely separate stages of the same disease, is in his mind so obvious as to need neither discussion nor proof. In this I do not at all agree with him. It is very possible that Mr. Lucy's disease (if I may so call it for the sake of convenience) is really only the early stage of Mr. Davies-Colley's; but no genuine proof whatever of this is furnished by anyone of the recent writers on this subject.

For my own part, of the six or eight patients who have applied to

<sup>1</sup>Clinical Society, March 25, 1887.

<sup>2</sup>British Medical Journal, May 25, 1887, p. 1158.



me professionally, complaining of symptoms similar to those sketched by Mr. Lucy, not one has had the downward flexion described by Mr. Davies-Colley; and of the cases in which I have noticed "Mr. Davies-Colley's disease" (I will call it so at present, because its most suitable name and true nature are disputed), not one has come under my treatment for the toe deformity, but for some other affection occurring in the foot or leg affected.

Mr. Davies-Colley is properly content with saying that it "seems probable" to him that his "hallux flexus," as he calls it, tends in later life to change to hallux valgus.

I write without knowing Mr. Davies-Colley's reasons for this opinion; and therefore I particularly wish to avoid being in the least positive when I state a different opinion. My views and the reasons for them are as follow. It is perfectly clear that both hallux valgus and hallux flexus must each have a beginning. Hallux valgus places the joint affected in a position which does not correspond to any which the normal movements of that joint permit. For instance, no normal movement permits the great toe to be adducted perceptibly at the metatarso-phalangeal joint. A small amount of adduction is possible when the joint is extended, but not enough to make it incorrect to say that early stages of hallux valgus strike the eye at once. Surely nearly every one of us must have seen hundreds of such cases. Many of us have only to look inside one or other of one's boots to find a great toe in a state of incipient hallux valgus, in most cases, thank goodness, never to get any worse.

But the conditions described by Mr. Davies-Colley and Mr. Lucy are comparatively infrequent.

Mr. Marsh speaks of having notes of twenty cases, and gives two specimens, of which one appears to be a case of chronic rheumatoid arthritis, pure and simple.<sup>1</sup> It is to beg the question of the nature of these affections to put obviously rheumatic cases into the same category with them. Mr. Cotterill saw three cases within a month. Another writer considers the affections in question to be so common and so easily cured by every surgeon endowed with common sense that he

<sup>1</sup>British Medical Journal, May 28, 1887, p. 1156.

writes as if outraged by having had the unworthy subject thrust beneath his eyes. Mr. Davies-Colley is surgeon to Guy's Hospital and has met with five cases in the last nine years.

It is, however, often possible to find tenderness of the metatarso-phalangeal joint of the great toe of persons with flat foot, *on inquiring for it*. But their spontaneous complaints are almost always directed quite elsewhere, namely to the front and outer side of the ankle.

Further, the beginning of hallux flexus must be more obscure, leaving subjective symptoms out of the question, than the beginning of hallux valgus because hallux valgus is only a fixation of a perfectly normal position into which every freely movable great toe can be placed with ease.

Davies-Colley's "hallux flexus" would, therefore, be exceedingly likely to begin with the symptoms of Lucy's "stiffness of the great toe joint."

But I confess I have never observed the transition, nor do the essays and letters before me furnish any evidence of it.

I can well believe, moreover, that some cases of hallux valgus may begin with pain and stiffness of the metatarso-phalangeal joint of the great toe. Nevertheless in the vast majority of such cases no such history can be obtained.

We come now to the question of *cause*.

There is a unanimous opinion that short boots form one essential factor of both stiff great toe and hallux flexus. Mr. Davies-Colley says his patients had abnormally long great toes. He did not think flat-foot had much to do with it. Mr. Cotterill is "convinced that most, if not all, typical cases are dependent upon a combination of flat-foot (or a tendency to it) with rigid and short boots. Flat-foot alone will not produce it; ill-fitting boots alone will not do so; it requires a combination of the two." He adds, "a short boot might perhaps set up irritation in the joint, but will not cause the disarrangement of parts peculiar to this disorder." A short boot is certainly capable of setting up "irritation within the joint," namely heat and tenderness and pain without any co-existent flat-foot. This I have seen more than once and cured by mere removal of the cause.

With regard to rheumatism, I think there can be no doubt that the cases described by Messrs. Lucy, Davies-Colley and Cotterill had nothing to do with it in their original causation. And there can, of course, be no doubt that true spontaneous rheumatic arthritis does occasionally attack the great toe joint.

But the question arises in my mind whether Lucy's disease, though itself originally a traumatism, pure and simple, has not, in cases in which it advances to the production of actual deformity, set up a pathological process identical with the rheumatic or rheumatoid changes which so frequently attack joints which have been bruised or fractured. Whether these constitute true rheumatism or not it will be easier to answer when it is known for certain what rheumatism is. Such pathological observations as have been made (and will be noticed presently) support this view.

Mr. Marsh writes "the idea may appear fanciful—too fanciful, perhaps, to be discreetly put into print—but I have often thought that the condition is in some way connected with the development of puberty.

The cases are so strikingly alike, so strictly, in my experience, limited to patients between the ages of 12 and 20, and so frequently unaccompanied by any other joint affection, that they seem to constitute a specialised group depending on some common cause, and, vague as the suggestion may be, this cause seems in some way associated with the change to which I have alluded." Dr. Ord's observations on the association of osteo-arthritis with peculiarities and disorders of menstruation are then referred to.

Granting that a rheumatic or rheumatoid element does share in the pathology of this disease, it is possible that there may be something in the above hypothesis, though it is a little too vague to carry our knowledge much further.

Mr. Marsh "is not convinced" that short boots are the causes of the affection. It is to be noted that while he writes only in reference to Dr. Lucy's paper, his cases bear greater resemblance to those of Mr. Davies-Colley, whom he does not mention. In both the cases he describes in detail, the point of the great toe was slightly directed downwards; there were distinct changes in the bones and great rigidity.

Sir Dyce Duckworth thinks that were such affections as hallux flexus really caused by bad boots they would be more common. He inclines to suspect a constitutional origin.

Passing on to the question of pathology and anatomy, Mr. Davies-Colley, who has treated some of his cases by excision, "usually found," we are told, that "the cartilage had lost its pearly lustre, was thin, and the ligamentous tissue was thickened." Mr. Charters Symonds states that in one case which he had examined, both cartilages were fibrous and partially removed; the bone was not exposed. The changes were those of rheumatic arthritis "

These anatomical descriptions exactly tally with what might be expected from examination during life. The joint can sometimes be distinctly felt to have lost the perfect smoothness of its natural movements. Osteophytic growths, and slight, real or apparent, osseous thickenings are sometimes distinguishable around the margins of the joint. I am speaking now of cases whose symptoms correspond to Lucy's description; but, when hallux flexus is plainly present, the above physical changes are still more marked.

Lastly comes the most important question of *treatment*. As usual, the writers differ most of all on this. The one point upon which there is universal agreement is that the boots shall be of proper size and shape.

Mr. Lucy has had partial success, but only partial, from "painting the joint with iodine, and ordering a longer boot with higher blocked toes, as much rest as possible being also enjoined.

With regard to the treatment of hallux flexus, Mr. Davies-Colley in some cases divided the inner band of the plantar fascia and the short muscles of the sole about three-quarters of an inch behind their insertion into the sesamoid bones and first phalanx. These cases were for the time cured, but one returned in two years in a still worse condition as regards flexion, with some outward displacement in addition; in fact, in an incipient state of hallux valgus. In this case a good result had followed resection of the metatarso-phalangeal joint.

In two other cases he had excised the proximal half of the first phalanx, leaving the head of the metatarsal bone, with the sesamoid

bones, and interfering as little as possible with the attachments of the muscles. Primary union had followed and the patients were soon able to walk upon the flat sole. In one of them, twenty-two months after the operation, there was no appearance of deformity, and the patient had walked twenty miles without any difficulty the day preceding.

Mr. Cotterill, who takes for granted the assumption that tenderness and stiffness of the metatarso-phalangeal joint of the great toe is the first stage of the condition of contraction and deformity described by Mr. Davies-Colley, says that he "has never failed to cure any case of early disease (that is, before ankylosis) by taking proper means to support the instep." It is, therefore, clear that this very success must have prevented him from observing the transition of such a condition as that described by Mr. Lucy into "hallux flexus."

"In more advanced cases," where the pain is severe and swelling considerable, fomentations, rest, gentle support with slight splints," etc., are recommended by Mr. Cotterill as a preliminary to treating the flat-foot.

Upon the whole, judging by my own experience as well as by the opinions of others, I believe "fomentations, gentle support with light splints," etc., to be a waste of time. With regard to treating every case of stiff great toe as one of flat-foot, neither I nor anyone else but Mr. Cotterill seems to have tried the plan. This surgeon would reserve excision for cases of firm ankylosis. But, in how many of these cases is there really firm ankylosis? Why, even in the cases which have been excised, the cartilages though thinned, were not wholly removed.

Turning now to Mr. Marsh, he appears to have tried upon these toe cases nearly every conceivable remedy, exclusive of operations, ever thought of for treating chronic joint disease. And he does not state definitely that he once succeeded. No wonder then that he describes treatment as "unsatisfactory."

I remember, about five or six years ago, showing Mr. Marsh a case presenting such symptoms as those described by Mr. Lucy. Mr. Marsh informed me that it was a condition which had attracted the attention of Sir James Paget, who had tried a variety of remedies. es-

pecially leather splints, without curing his patients. I told Mr. Marsh, speaking from experience, that I should cure my patient with plaster of Paris, and I did. Mr. Marsh now writes: "In one case I kept the toe fixed in Plaster of Paris for three months. Complete rest, however, has appeared to be of very slight benefit."

In studying the effects of treatment, it is of no use to lump all painful affections of the metatarso-phalangeal joint of the great toe together. This joint, small as it is, deserves the same respectful mode of consideration as the hip and the knee-joint. No one would expect fixation to cure such a case as Mr. Marsh's Case II; and even his Case I may have gone too far for such treatment. But when very little thickening of the joint ends exists and manipulation discovers little or no injury to the cartilages, then, according to my experience of half a dozen cases so treated, plaster-of-Paris gives excellent results. But the case must be properly applied by some one who realizes that skill and practice are required in so simple a matter as making a plaster splint. It should also extend upwards as far as the instep. It should also be everywhere absolutely rigid. I have frequently seen (in the case of larger joints), gentlemen, watching the effects of plaster cases as soft and supple as thin leather in critical parts of their extent.

But marked symptoms of chronic rheumatoid arthritis, accompanied by deformity, are not to be *cured* by fixation of any kind. They may, however, be relieved by it.

On the other hand, mere contraction may, as Mr. Davies-Colley's cases show, be successfully treated by subcutaneous division of contracted soft structures.

Finally, an advanced class of cases remains in which the amount of deformity and the extent of rheumatoid changes in the joint can only be thoroughly dealt with by excision either of the joint or of the proximal end of the first phalanx.

*Final Remarks.* There are some points I should like to refer to before concluding this paper. Firstly, it has been stated by several gentlemen that the condition above described are confined to the male sex, and commence only in youth. I am certain that the female sex are sometimes affected, and I believe that one of my cases, a gen-



tleman aged 40, who, (though an old friend of mine, never walked lame or complained to me until about three years ago), developed a stiff metatarso-phalangeal joint long after boyhood. I have written to him on the subject and await his answer.

With regard to sex, a young lady was sent to me about three years ago by Mr. C. H. Taylor, late House Physician to the West London Hospital, and she suffered from a stiff and tender metatarso-phalangeal great toe joint. I put on a plaster of Paris case, but, as it caused a slight soreness of the skin, it had to be removed. The patient was shortly afterwards persuaded to try a surgeon, who manipulated and exercised her joint and condemned rest. I saw Mr. Taylor last week, and he tells me that she is no better.

When it is absolutely necessary for this lady to move about in order to obtain some important object; she can, as it were, temporarily walk the stiffness and tenderness off, and remain for hours on her feet. But her case is not one of pure hysteria, by any means.

Some young women with flat feet will also confess to tenderness of the metatarso-phalangeal joint of the great toe, if they are asked.

The tender spot in most cases is, I believe (I am writing from memory, not from written notes) towards the outer side of the dorsal aspect of the joint, just beneath the tendon of the extensor proprius pollicis. Mr. Cotterill has also remarked that the tenderness is on the dorsal aspect. Mr. Lucy refers it to the ball of the great toe. Was there a callosity or corn developing there?

It is curious that affections so important, so interesting and sometimes so difficult to cure should not have been hitherto described in text-books. The fact is that writers of text-books of moderate size are the very opposite of anxious to enlarge each edition by introducing descriptions of newly observed conditions of less than the first importance. Mr. T. S. Ellis, of Gloucester, who some years ago recommended systematic exercises as a treatment of flat-foot, perhaps it should rather be said as *the* treatment for it, is of opinion that all deformities of the great toe can and should be dealt with on similar lines.<sup>1</sup> He goes so far as to write: "Given sufficient patience and

<sup>1</sup>British Medical Journal, May 27, 1887, p. 1,157.

determination, and it is surprising how bad a condition may be removed, and *perfect recovery of outline* and of function attained by these means alone." [The italics are mine.] I have used for years, and still continue to use Mr. Ellis's exercises in the treatment of flat-foot, and have pleasure in bearing witness to their value as a means of removing pain and weakness, but as for *recovery of outline*, all I have observed leads me to congratulate the people of Gloucester on the supernatural patience and determination" they must possess if Mr. Ellis's impressions are correct.

One word more with regard to all appliances for the treatment of affections of the toes. The impossibility of getting the boot ordinarily worn by the patient, to contain them, makes him often disinclined to wear them until a stage has been reached in which mere appliances are scarcely enough to cure him.

C. B. KEETLEY.

#### WITZEL ON INJURIES OF TENDONS AND THEIR TREATMENT.

A very complete study of the injuries of tendons and their proper treatment has been made by Dr. Oscar Witzel,<sup>1</sup> and we give a brief résumé of his views. The greater part of injuries of tendons are complicated with wounds, and yet isolated cases of subcutaneous rupture of tendons do occur. Witzel thinks that there is always some pathological change in the tendon in these cases. A previous tendo-synovitis may cause the infiltration of the tendon with serum, the tendon may be partly worn and ravelled in hydrops of the sheath, or reduced to a third or a quarter of its diameter in hydrops with lipomatous degeneration of the sheath.

The actual rupture may be caused by vigorous muscular action, but it is probably more frequently due to over-extension of the tendon and its usually weakened muscle. Hence in every case of sprain of a joint the examination should be sufficiently thorough to exclude this injury. The situation of the rupture can be detected by the finger, feeling the step-like gap between the ends of the tendon, as after tenotomy, the

<sup>1</sup>Ueber Sehnenverletzungen und ihre Behandlung, Volkmann's Sammlung klin. Vortraege No. 291.

interval being filled with a soft clot of blood, which may give a crackling sensation to the finger. The chief symptom will be loss of function in the muscle the tendon of which is ruptured. If the ends can be brought into close contact, and care is taken during the treatment that they remain in apposition, union may be confidently expected. If the ends cannot be approximated by manipulation of the limb, incision and suture are indicated, as in fracture of the patella and olecranon. But it will be best to delay the operation until the first inflammatory reaction has passed, so as to avoid the presence of blood, so easily made septic in the sheath of the tendon.

One feature common to nearly all wounds with injury of tendons, is that they are directed more or less transverse to the axis of the limb and to the course of the tendon. The character of the instrument is of great importance, for clean-cut wounds heal much more rapidly than wounds with contused and lacerated edges, but the most important element is the presence or absence of septic matter.

The prognosis is very uncertain, and chiefly depends upon the condition of the wound with regard to sepsis at the time when it first comes under treatment.

Secondary necrosis of parts of the tendon may follow if suppuration takes place, but this is much less likely to occur, or at least to be extensive, if the suppuration is not septic. As it is impossible to determine how septic the wound may be, if there is any doubt upon this point, the wound should be left open, since the amount of injury caused by the suppuration will be diminished by allowing free escape to the discharge. This must also be done if the tendon has suffered much contusion. Suture of the tendon cannot be attempted in these cases, but an operation for suture can be done later, when the wound is granulating well, and all septic infection has disappeared (intermediate suture), or when the wound has entirely cicatrized (secondary suture).

That extensive exposure and isolation of a tendon in a wound will be followed by its mortification, is an old teaching. But if the wound is aseptic, gangrene will not occur so long as the nourishing covering of the tendon remains, and the blood-supply is maintained. If the

blood-supply is cut off, the isolated part dries up, turns gray, and is thrown off by granulation at the edges.

Simple division of a tendon by incision is a small matter, for experience teaches that the divided ends rapidly unite if kept in contact, uniting by first intention like other tissues. The material for this union appears to be supplied rather by the sheath than by the tissue of the tendon, and the two ends are joined by a mass of callus (like a fractured bone) which is at first adherent to the neighboring parts. These adhesions are separated by motion, and the exuberant callus wears off by friction, so that the point of union cannot be detected even by a longitudinal section of the tendon.

The great difficulty in injuries of tendons lies in the retraction of the divided ends—a separation which is greatest when the tendon lies in a long synovial canal. The two ends become adherent in this position of separation, and the muscle suffers atrophy from disuse; even if the ends are united by the interposition of new tissue, the muscle loses in power.

Whenever there is a possibility that tendons have been injured in a wound, especially upon the anterior surface of the hand and forearm, the action of every muscle should be examined. All the movements of the hand should be made, the fingers spread apart (loss of the power to separate the fingers indicating that the ulnar nerve has been injured), and the fingers flexed while separated, and due allowance made for the action of auxiliary muscles. The projection of the tendons under the skin must be looked for. Another reason for thorough examination of the action of the muscles in fresh injuries, is the great danger of overlooking some tendon when more than one have been injured.

In the examination of such wounds, as full antiseptic precautions must be employed as in the examination of a compound fracture. Anæsthesia and Esmarch's method are very useful, the former assisting as much by relaxation of the muscles as by prevention of pain.

By moving the limb in a direction opposite to that in which the affected muscle moves it, the retracted ends of the tendon can often be made to appear in the wound. Should this fail to bring the central end

into sight, the muscle must be strongly compressed, and stroked downwards from its origin, towards the periphery, by the hands of a strong assistant or by the rubber bandage wound from above downwards. Some attempt to lay hold of the end of the tendon with forceps inserted into the sheath, but there is great danger of septic infection in this manœuvre, as well as danger of tearing or contusing the tendon. It is far better to enlarge the wound at once. But by the old method of enlarging the wound—cutting directly down upon the tendon, it was often difficult to unite the skin over the tensely stretched tendon after suture, and the tendon was liable to become firmly attached to the cicatrix. Witzel prefers to make an incision in the skin, beginning at the wound, to one side of tendon and parallel to it, and to dissect up a flap until the tendon is exposed. The sheath of the tendon is then opened, if possible, on the side. This method also affords an opportunity to thoroughly drain and disinfect the sheath, which has almost certainly been rendered septic by the retracting tendon.

The needles of Hagedorn are best for suturing tendons, because they separate the fibres without tearing them. But the same object can be attained with the fine needles curved on the flat employed in operating for hare-lip, if they are passed with their greatest diameter parallel with the fibres. The best material for sutures is the bichloride catgut of Hagedorn.

Any suture which is at all constricting will prevent union, by cutting off the blood-supply, hence Nicoladoni's suggestion to make the sutures of the most delicate material, and to relieve them of tension by passing an acupuncture needle, or a catgut suture through the tendon and the tissues overlying it, at a distance of one inch above the point of division, is excellent. Witzel has found it simpler to pass a medium sized catgut suture through each end of the tendon, one centimetre from the point of division, after they have been exposed in the wound, and to tie the ends of these sutures together after the true sutures have been inserted, so as to remove all tension from the latter. If the distal end is too short to allow of this suture, it is to be passed through the soft parts and skin, and the other suture secured to it.

The greater security afforded by these relaxing sutures enables the surgeon to make passive movements of the limb, and thus to place the sutured point so that it does not correspond with the wound; or, when more than one tendon has been injured, to arrange the points of suture of different tendons so that they do not lie in one place. It is well to place some strands for drainage under the flap, down to the point of suture, but not in contact with it.

If the wound is septic, the tendons can be sutured and the rest of the wound left open. But if there is doubt as to whether the sepsis can be entirely corrected, it will be better not to attempt even this. In such a case the method of Nicoladoni would be useful to prevent retraction of the ends—at any rate, the limb must be put at rest in such a position that there will as little retraction as possible. Whether intermediate suture, suture in the granulating wound when all signs of sepsis has disappeared, is advisable, remains for experience to prove—thus far the evidence is in its favor.

Secondary suture of tendons, the wound having completely cicatrized, may be begun with a rectangular or convex flap, the long side lying to one side of the tendon and parallel with it. The tendon must be very carefully dissected from the cicatrix with blunt instruments, so as to avoid subsequent sloughing. If there is cicatricial tissue filling the gap between the ends, this must be dissected out, and left attached to the tendon. The ends are then freshed and united with sutures.

But if the ends cannot be made to meet, some plastic operation becomes necessary. It is best to cut the flap to fill the interval from the peripheral end; but the central end may be used, and in one case an entirely isolated piece of tendon has been successfully grafted in. The experiments and cases of Glück show that even catgut, or silk, or strips of India rubber may be employed as grafts.

If even this is impossible, there remain, as last resorts, the implantation of the peripheral stump in the tendon of a neighboring muscle which has a similar action; its attachment to a less important muscle, the tendon of the latter being cut away; or the splitting of an uninjured tendon and muscle so as to form two, and using one to replace the muscle which has been lost.



\* The dressing must be left untouched as long as possible, and as soon as the drainage openings are all closed the fixation apparatus should be removed, so that voluntary motion may begin. Two weeks after the operation, massage is to be begun, and one week later, passive motion. If the course of the wound is not fully aseptic, and it becomes necessary to remove the dressing and re-open the wound, the sutures in the tendons should be left in place, unless it is absolutely necessary to cut them, as union has been known to occur even when slight suppuration was present. But in such cases motion can only be begun when the wound is closed or reduced to a superficial ulcer. If a plastic operation has been done, motion must not be undertaken until four weeks have elapsed.

B. FARQUHAR CURTIS.

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A NEW CLASSIFICATION OF TUMORS IN GENERAL AND OF  
TUMORS OF THE TESTICLE IN PARTICULAR.<sup>1</sup>

In a paper of considerable length, Messrs. Monod and Arthraud have developed a complete classification of tumors in general and of the seminal gland in particular in extension of the embryonic theory of Cohnheim. A brief review of the history of the various theories with regard to tumors being considered necessary, they pass rapidly over the earlier hypotheses, beginning with the heteromorphic theory of Laennec, formulated by Lebert and defended by Broca, who considered tumors as parasitic productions absolutely foreign to the constitution of the normal tissues. This was followed by Müller's doctrine of the heterotopia of neoplasms, which he considered to consist of the normal elements, their appearance being referable to a still unknown deviation of the normal evolution of the tissues. In his cellular pathology, Virchow attempted to show the processes employed by the organism to develop these morbid masses in the midst of healthy tissues. The dominant thought of Virchow was the substitution of the observation of present and transient forms of the diseased tissues by the study of the successive transformations which they may undergo;

<sup>1</sup>Considerations sur la classification de tumeurs du testicule. Par le Dr. Ch. Monod et le Dr. G. Arthraud, de Paris, *Revue de chirurgie*, 10 Mars, 1887.

in other words, to replace the idea of form by that of evolution. But in admitting the origin of all tumors from the connective tissues, this author took a step, seductive in its simplicity and destined to great popularity, but not tenable for all tumors. Through the labors of Robin and Waldeyer, a grand class has been detached from Virchow's connective tissue family; this class includes epithelioma with its various grades extending to carcinoma, and their origin should be referred to epithelial proliferation and the hypothesis recognized by the name of epithelial theory of cancer.

The true nature and mode of development of sarcoma is still involved in obscurity, and its study is rendered the most difficult in pathology because of its complexity and the almost infinite variety of type which it presents. However, the investigations of Robin on arachnoidal and peritoneal tumors, Lancereaux on endothelial tumors of the lymphatics of the peritoneum, Gaucher, demonstrating that so-called epithelioma of the spleen developed from the lymphatic and vascular endothelia of the gland; Waldeyer and Malassez defining cylindroma to be primitively an endothelial or perithelial new formation; and Monod and Arthraud showing that certain melanotic tumors of the retina, commonly described as sarcomas, should be considered as endothelial tumors more or less diffuse in form—these investigations have detached from the class of sarcoma as originally constituted certain tumors, the point of origin of which is manifestly in an endothelial surface, and which constitute a distinct anatomical group, that of endothelioma.

It is believed, however, that between sarcoma and endothelioma a relation exists similar to that between carcinoma and epithelioma. Such a relation is excellently shown in the angiolithic sarcoma of the arachnoid, which is in reality a form of endothelioma of the serous membrane and presents numerous varieties extending from the pure endothelial type to sarcoma by transitions which can be followed step by step. Moreover, just as certain epitheliomas sometimes recur and extend under the form of diffuse epithelioma (carcinoma), so also certain pure epitheliomas may be transformed *in situ* or at a distance into diffuse sarcoma. This is true for example in sarcoma of the choroid,

which at the beginning may be considered as a type of endothelial tumor and which, when it recurs after ablation, generalizes in the form of diffuse melanotic sarcoma. It seems legitimate then to conclude that the endothelial type is the common stock of the so-called connective tissue tumors, which differ from one another only as they deviate more or less from the primitive or fundamental form, or become more or less atypical.<sup>1</sup>

We may then deduce from these facts two principal laws, one formulated by Müller: *every tumor is constituted by a tissue analogous to the normal tissues*; the other, deduced from the researches of Virchow; *the elements of tumors are derived from the elements of the organism*.

There is yet much to be learned of the natural history of tumors, and not the least of the points still involved in obscurity is the cause of the appearance of neoplasms. Why does a fraction of tissue, isolating itself from the organism, all at once suddenly or gradually, the more often without apparent cause, develop and assume the proportions and character of a tumor. In some productions this question

<sup>1</sup>The following table defines and summarises the ideas which have been presented.<sup>a</sup>

<i>Type adenoma or papilloma.</i>	<i>Type pure endothelioma.</i>	<i>Type metatypical endothelioma.</i>
1. Plexiform angioma (Waldeyer).	1. Angiosarcoma. Cylindroma (Waldeyer, Malassez)	1. Spindle-, or round-celled sarcoma: myeloid sarcoma (Robin, Malassez).
2. Lymphangioma.	2. Lymphangiosarcoma. Ganglionic endothelioma (Chambard, Gaucher). Lymphadenoma (Lancereaux).	2. Lymphosarcoma. Diffuse sarcoma of serous membranes and articulations.
3. Papillary epithelioma of serous membranes and cavities.	3. Endothelioma vulgaris of serous membranes (Robin). Angiolithic sarcoma. Melanotic endothelioma of the eye and skin.	3. Osteosarcoma. Myxosarcoma. Melanotic sarcoma.

<sup>a</sup>We consider in epithelial or endothelial tumors three essential types, differing (1) by the nature and morphology of the cellular elements, and (2) by the relations of these elements with the neighboring tissues. The type *adenoma* or *papilloma* is characterized by simple hyperplasia with conservation of the normal form and normal relations. The type *epithelioma* or *endothelioma* is limited to the conservation of the form and alteration of the relations. The type *carcinoma* or *sarcoma* is differentiated from the other two by the simultaneous modification of these two grand characteristics.

has been very satisfactorily answered; the studies of Ponfick on actinomycosis, of Koch on tubercle, of Bouchard, Klebs and Birch-Hirschfeld on glanders, lepra and syphilis have permitted the separation from tumors proper of the specific products of certain maladies under the name of infectious tumors. These pathological products are connected by indisputable relationships, and constitute a natural family, having an etiology almost identical and a common structure and destiny.

In the same way is evident the mechanical or inflammatory cause, leading to the formation of cysts by the retention in a cavity of a secretion which should normally be excreted.

Aside from these cases, the etiology of tumors is very obscure; the facts certainly show that they are neither contagious nor inoculable, and consequently possessed neither of a specific poison nor parasite. Among the various explanations of the origin of tumors the embryonic theory of Cohnheim is attractive by its simplicity and completeness. He holds that all tumors proper are due to some trouble or vice of development. At some period of embryonic life are produced certain involutions of the blastodermic layers, resulting in the formation of an isolated cellular mass in the tissues which remains quiescent and does not assume activity until a period at a greater or less distance from birth.

The various types of tumors and the differences in structure which they present are easily explained by the consideration of the period of embryonic life at which the involution occurred. According, as this was early or late, the elements of the included part are more or less differentiated; when, under an influence still unknown, life is awakened in these dormant elements, the evolution continues at the precise point where it was arrested, and produces either an embryonic tumor, if the arrest has been early, or a tumor formed of adult tissues (fibroma, lipoma, myoma or neuroma) if it has been late. The laws of Müller and Virchow are logical corollaries of this pathogenic theory, since, directly derived from the normal elements of the organism, tumors can produce only the types proper to the cells or tissues which have given birth to them.

Thus constituted, living their own life more or less independent of the rest of the economy, since they have no relation with the nervous system, the regulator of nutrition, these morbid products increase, multiply and reproduce without limit, with a facility and rapidity the greater as the type under which they are evolved approaches nearer the early phases of embryonic life. They employ for their nutrition, like veritable parasites, the materials accumulated from the tissues in the midst of which they are engrafted, determining a sort of cachexia of varying character and, if nothing obstructs their progress, producing death by marasmus, generalization or infection.

The embryonic theory permits the explanation of certain points in the history of neoplasms, among which are hereditary transmission, the influence of traumatism upon the development of tumors, and their appearance preferably at puberty and at the menopause or the onset of old age; it is admitted that at these two periods of life congestions appear, capable, like traumatism of exciting the development of these embryonic masses, arrested in their evolution, and which would otherwise remain quiescent and sterile.

While it is impracticable here to recount all the arguments in favor of this theory, we may remark that dermoid cysts of the ovary and testicle, the congenital origin of which is indisputable, form a class of congenital productions which remain latent for years and may suddenly, preferably at puberty, and the menopause, develop rapidly and unceasingly and without other limit than the life of the patient.

However, a still stronger proof is apparent from the experiments of Masse who grafted into the peritoneum of adult dogs the debris of the tissue of an embryo of the same species, and saw veritable dermoid cysts develop at the point of inclusion. Messrs. Monod and Arthraud consider this demonstration conclusive and an *a posteriori* verification of the hypothesis of Cohnheim that *all true tumors are the result of a vice of embryonic development*.

It should be remarked that they have added the word "true" to the law of Cohnheim and that by a *true tumor* is meant a *new organ which develops at some period of post-embryonic life and which follows in its evolution a course analogous to that which marks its growth at*

*the epoch of primitive organization.* This definition creates in the category of new formations two classes which are often confounded clinically under the general term, tumors. The first class, which alone is considered in this paper, comprises the *true tumors*; in the second class are ranged all the *neoplasms of inflammatory or trophic origin*, which may sometimes present a morphology identical with that of true tumors, but which always differ essentially from them in their progress, duration and evolution. The infectious tumors, belonging to this class, have already been noticed; to this same family may be assigned the hyperplasias of trophic or diathetic origin. Tumors of the sarcomatous family and the granulations of fresh inflammation are identical in structure, but the history shows the former to be tumors and the latter pseudo-neoplasms. Illustrations of this condition may be multiplied, and in many instances it is difficult to exactly locate particular cases.

However, taking the laws of Müller and Cohnheim as a basis and guide, it is possible, by an analysis of the facts now known, to establish by synthesis a really scientific classification of tumors. The following table presents such a classification applied to tumors in general, a subject which Messrs. Monod and Arthraud propose to develop more fully at some future time.



## A.—TRUE TUMORS.

CLASS I.—*Teratoma*—Tumors developed from the three layers of the blastoderm. { Fœtal inclusions.  
{ Dermoid cysts.

CLASS II.—*Mixed Tumors*—Tumors developed from two layers or from the various elements of one. { Ento- or ectomesodermic { Mixed epithelioma. { Chondromatous (chondrocarcinoma).  
{ Myomatous.  
{ Myxomatous (cystosarcoma).  
{ Lipomatous.  
{ Chondromatous (chondrosarcoma).  
{ Myxomatous myxosarcoma).  
{ Myomatous (myosarcoma).  
{ Lipomatous.

CLASS III.—*Pure Tumors*—Tumors developed from a single layer of the blastoderm.

Ectodermic Tumors.	Epithelial type.	Adenoma or papilloma.	Glandular adenoma.
			Corneous papilloma.
		Typical epithelioma.	Pavement epithelioma
			Lobular ———
			Pearly ———
			Papillary ———
	Metatypical epithelioma.	Tubular ———	
		Glandular ———	
		Keratinized ———	
		Encephaloid carcinoma.	
Adult or differentiated type.	Neuroma.	Myelinic neuroma.	
		Amyelinic neuroma.	
Entodermic Tumors.	Epithelial Type.	Adenoma or papilloma.	Adenoma or papilloma of the intestine and its annexes.
		Typical epithelioma.	Cylindrical epithelioma of the intestine, the stomach, the liver, the kidney, the testicle and the ovary.
			Mucoid epithelioma.
		Metatypical epithelioma.	Carcinoma of the same organs.
	Angioma or papilloma.	Angioma or plexiform lymphangioma.	
		Papilloma of serous membranes	
	Endothelial type.	Typical endothelioma.	Angiolithic sarcoma.
			Angiosarcoma.
			Myeloplaxic sarcoma.
			Lymphangio sarcoma.
Lymphadenoma.			
Cylindroma.			
Endothelioma.			
Endothelial sarcoma.			
Metatypical endothelioma.	Melanotic sarcoma of the eye		
	Lymphosarcoma.		
	Diffuse melanotic sarcoma.		
	Myxosarcoma.		
Adult or differentiated type.	Connective tissue type.	Glioma.	
		Chondroma.	
	Muscular type.	Lipoma.	
		Myxoma.	
	Fibroma.		
	Rhabd. myoma.		
	Leiomyoma.		

## B.—INFLAMMATORY OR TROPHIC NEOPLASMS.

CLASS I.— <i>Connective tissue and muscular neoplasms.</i>	Pure connective tissue type.	Embryonic.	{ Wound-granulations. Embryonic infectious tumors (syphilis, tubercle, etc). Echondrosis. Pseudo-lipoma. Fibrous infectious tumors. Gouty and rheumatic nodes. Laminated fibroma. Keloid. Amputation-neuroma. Lipomatous diathesis. Accidental lipoma. Trophic lipoma. Plat s of arachnitis. Ossified plates of the peritoneum and pericardium. Syphilitic osteoma. Exostoses	
		Adult.	Chondroma	{ Uterine leiomyoma (uterine fibro-myoma). Muscular hypertrophy. Papilloma, condyloma, wart, et . Glandular hypertrophy. Retention cysts. Goitre, ranula. Vascular ectasia. Anæmic lymphoma.
			Myxoma.	
			Fibroma.	
CLASS II.— <i>Epithelial neoplasms.</i>	Muscular type.		Lipoma.	{
			Osteoma.	
			Myoma.	
	Epithelial type.			
	Endothelial type.			

Now, having indicated in a general way the various phases through which the history of the origin of tumors has passed and what more precise and satisfactory ideas we have acquired at the present day, it remains for us to apply these to tumors of the testicle. The study will properly begin with the consideration of the more complex tumors, since the theoretical plan for our guidance being provided, an examination of the clearly congenital types will assist us in comprehending the true nature of tumors of more simple structure but of less evident etiology. In this particular case, however, beginning with complex and ending with pure tumors is really proceeding from the simple to the compound; it is, in fact, passing from the admitted and demonstrated, by an insensible transition the steps of which will be noted, to a conclusion which might *a priori* have appeared untenable—the identity of origin of all true tumors of the testicle.

Complex tumors of the testicle are of two classes:

1. Various congenital cystic formations of which inclusions affecting the testicle and scrotum are the highest type, and dermoid cysts the most rudimentary form.

2. Mixed tumors, with or without cystic formation, composed of two or three fundamental tissues more or less blended in the same neoplastic mass.

It is purposed to demonstrate a common origin for these two classes of tumors in the testicle and then to show how the third class of pure tumors may itself be allied to the others.

I. FŒTAL INCLUSIONS. DERMOID CYSTS. TERATOMAS.—The complicated teratological productions known as foetal inclusions are especially found developed in the testicle and the more often in relation with the gland, but not from it. They should be allied with dermoid cysts; in fact, upon passing in review the published cases, it will be observed that in these inclusions are the more often found only complex masses formed of various tissues presenting a rude outline of organization, but ordinarily having but slight resemblance to foetal debris. The tumor is most always reduced to a cyst more or less compound, containing hairs, fleshy masses and ossified parts, sometimes real bone.

Between these tumors and dermoid cysts then, there is but a difference of degree, and to show this analogy it is proposed to unite them in a class under the name of teratoma, a name excellently suggesting the relationship with the teratological cases to which they are so nearly related.

The embryonic origin of these tumors is almost universally admitted, and their pathogeny, following the views previously advanced, should be referred to a vice of development of the blastodermic layers, to the isolation within tissues in the process of formation, of a small mass detached from these layers and possibly composed of many elements. These embryonic masses pursue their evolution with a rudimentary organization sometimes forming organs and fragments of organs, but never constituting a complete organic system.

The very great complexity of these tumors would seem to indicate that the more often the three blastodermic layers participate in their formation. This may readily occur if they originate in the first days of intra-uterine life at the moment of the formation of the genital organism, *i. e.*, at an epoch when there can be observed in the caudal region of the embryo an almost physiological fusion of the three layers. This circumstance is doubtless eminently favorable to division and separation of an isolated fragment composed of elements derived

from each of them. Thus in these tumors, when completely developed, may be found either connective and muscular tissues, if the middle layer is included in the invagination ; or cartilage and bone if the provertebræ have been involved in the inclusion ; or epithelial debris of a cylindrical or pave-type, according as the endoderm or ectoderm is concerned.

From this standpoint it can be seen that there is no real difference between inclusions and dermoid cysts ; in fact, it is possible to find by minute analysis of cases intermediate types from the tumor by inclusion—the contents of which resemble a veritable fœtus—to the common dermoid cyst, consisting of a dermo-epidermic wall circumscribing a cavity with pilo-sebaceous contents. Moreover, in the more simple dermoid tumors, a complete examination will almost always discover some more complex part resembling the structure of tumors by inclusion.

II. MIXED TUMORS.—In a similar way, it is possible to discover between teratomas and mixed tumors a relationship analogous to that between dermoid cysts and inclusions. Mixed tumors of the seminal gland are productions complicated in structure, which cannot for this reason be ranged in any of the grand classes of neoplasms admitted by pathologists ; in them are found the most various tissues ; epithelial cells arranged as in true carcinoma, embryonic elements analogous to those of carcinoma, cartilaginous tissues as in enchondroma, cysts of variable epithelial contents and covering, sometimes veritable osseous tissue, striated and non-striated muscular fibres, and even nervous tissue.

The existence in dermoid cysts of a cystic cavity ordinarily monocular and considerable, is not sufficient to completely differentiate them. This is due simply to some accessory circumstance as yet unknown, but which does not modify the intrinsic nature of the tumor. The almost necessary presence of pavement epithelium and its derivatives in dermoid cysts and inclusions, while it is almost constantly absent in mixed tumors, constitutes a differential characteristic which would seem to be very important ; it is impossible, however, to found the establishment of two entirely distinct categories of tumors upon this

fact alone. It is evident then that there are no essential differences between the structure of mixed tumors and that of teratomas; there are in both the same anatomical elements more or less varied and blended.

If then there really exists a close relationship between mixed tumors and teratomas, the natural conclusion would be that their origin is identical. How, moreover, can the union in the same mass, of elements so varied as those composing mixed tumors of the testicle, be explained without going back to the embryonic period where these elements originated?

When trouble supervenes in normal evolution and this at a point where, as has just been mentioned, the blastodermic layers are almost blended, and when this point of fusion is at the same time near that where the first vestige of the seminal gland appears, it is easy to understand that an isolated cellular mass detached from the embryonic tissue could be buried in the gland itself or its immediate neighborhood and later become the point of departure of a mixed tumor. It is probable, however, that this separation occurs at a little earlier period than does that of teratoma, and at a time when there is more distinction between the blastodermic layers, for the study of these tumors in the great majority of cases shows the elements of but two of these layers or even but one of them.

When the inclusion, and this is the most frequent case, affects the different parts of the middle layer or the parts derived but separated from the internal layer, the tumors developed are mixed enchondromas, sarcomas with cartilaginous kernels, mixed carcinomas and myomas of heterogeneous structure so frequent in the seminal gland. The inclusion of a Pflüger's tube will give rise to an epithelial neoplasm, but the tumor will rarely be pure, some cells either from the provertebræ or the lateral plates in the form of cartilaginous nuclei, or some masses of striated or non-striated muscular fibre in process of development are found here. In the same way sarcomas developed from endothelial elements, might contain pearls of cartilage, muscular fibres, and typical and atypical epithelial productions. And it is evident that the theory of Cohnheim permits us to understand the formation of as many vari-

eties as there are possible combinations between the different elements of the middle layer and the neighboring layers.

A review of the literature of tumors of the testicle shows that almost all of them are mixed. True chondroma is the exception, pure myoma is doubtful, pure sarcoma and carcinoma are far from common, and the most frequently the various tissues combine to form a variety of tumors, the existence of which our theory enables us to foresee.

III. PURE TUMORS. The pure tumors form the third and last class of the neoplasms which we have undertaken to classify. Two groups can be distinguished *a priori*: A. Those developed from the elements of the middle layer; B. Those developed from the internal layer and its derivatives.

A.—The tumors, the origin of which may be referred to the middle layer, are chondroma, myxoma, embryonic sarcoma, angioma, lymphangioma and myoma. All have been found in the seminal gland, but they are relatively rare there, at least without a mixture of heterogeneous parts. It could even be held that certain of them, considered as practically pure tumors because the foreign elements associated with the fundamental substances of the neoplasm are so limited in quantity that they often pass unperceived, should really be called mixed tumors, because of the presence of those elements.

It has already been noticed that pure chondroma of the testicle is exceptional, if indeed any cases are on record. Tumors of the muscular type, rhabdomyoma, leiomyoma, fibromyoma, are perhaps still more so. Sarcomatous tumors are much more frequent, for giant-celled sarcoma, adult angioma, and spindle- and round-celled sarcoma with all their varieties have been observed there.

All these tumors arise from the middle layer and their embryonic origin can be established by a reasoning analogous to that employed in connection with mixed tumors. It was shown that an evident analogy existed between teratoma and mixed tumor, and that intermediate types connecting them could be found, so that to the latter may be applied the hypothesis of embryonic origin, which is indisputable with the former. Now, between pure and mixed tumor, the stages of transition are still more numerous; the fact alone that it is sometimes difficult



to distinguish them from one another would seem to demonstrate this relation *a priori*. It would then be proper to suppose from this fact alone that the origin of these classes, so closely connected, is the same.

But still other evidences of the embryonic origin of this group exist. Chondroma, myxoma, myoma and in particular sarcoma often present a very clear embryonic structure. There may be cartilaginous kernels formed of foetal cartilage; certain muscular tumors contain striated fibres in course of development; the giant cells observed in certain sarcomas are simply embryonic vaso-formative cells.

The hypothesis that, under the influence of inflammation and a diathesis, the tissues resume the embryonic type is certainly less rational than the theory of Cohnheim, that buried and quiescent elements have resumed their interrupted evolution and pursue their development from the point where it was arrested. They present successively all the phases of normal growth, and microscopical examination of a tumor finds it at one of the periods of this organization.

In this way the distinct differences clinically separating the various productions enumerated can be explained. The nearer the tissues contained in a neoplasm approach the adult state, *i. e.*, the later the inclusion has occurred, the more benign is the clinical course. This is true of adult fibroma, lipoma and angioma; but in the contrary condition the progress of the growth is that of a malignant tumor, sarcoma, lymphadenoma, etc.

The hypothesis of Cohnheim then expresses the truth concerning mesodermic tumors as well as those previously studied.

B.—The entodermic tumors, developed from the internal blastodermic layer, are the epithelial tumors proper. They and mixed tumors are the most frequent in the testicle.

Epithelial tumors, by reason of their structure and evolution present two forms; the typical form, resembling more or less in disposition normal glandular tissue; and the metatypical form or carcinoma. Both of these forms may be shown to exist in the testicle.

The "typical" form of epithelioma of the testicle is represented in cystic disease of that organ. Malassez has demonstrated the complete

analogy between cystic disease of the testicle and cystic degeneration of the ovary; both are entitled by reason of the disposition of the epithelium which lines the cavity of the tumor, to the name given them by Malassez, mucoid epithelioma. Now mucoid epithelioma of the ovary being considered as a typical epithelioma, it is clear that cystic disease of the testicle belongs to the same category. These two forms of degeneration of the male and female glands evidently correspond to typical glandular epithelioma of the intestinal canal.

The "atypical" epithelial tumors of the testicle assume various forms, some of which greatly resemble cystic disease. The majority of the cases formerly described as cystic sarcoma, and almost all the cysto-adenomas of certain authors, were but more advanced phases of the more atypical modalities of cystic disease.

The true "metatypical" epithelioma (carcinoma) is more common. It is more often a very diffuse tumor, absolutely atypical throughout with a small amount of stroma and subject to mucoid and colloid degenerations, to partial gangrene and to multiple hæmorrhage. This form corresponds to the encephaloid tumor of old authors.

The scirrhus variety with dense stroma and few cellular elements is more rare. It is often accompanied by the formation of epidermic pearls resulting from the involution of canalicular epithelium.

In this class of tumors, the most varied appearances may be observed either from the relatively varying amount of stroma and cells or from secondary degenerations produced in the neoplastic tissue. The stroma is sometimes clearly reticulated (reticulated carcinoma). In other cases, melanotic infiltration of a greater or less part of the mass might cause it to be mistaken for a true melanotic carcinoma, the existence of which in the testicle is very doubtful. Degeneration causes other conditions. The destruction of a certain amount of the contents and dilatation of the capillaries of the stroma produces bloody lacunæ and the tumor becomes essentially vascular, forming hæmatoid carcinoma of the testicle. The neoplasm may undergo a caseous and mucoid degeneration altering its aspect to such an extent that anatomical diagnosis becomes almost impossible. But these secondary variations are without importance from the standpoint of the

classification of the tumors, for it is almost always possible to refer back to the original type and to range them in their proper place in the list of epithelial tumors.

By arguments similar to those employed in connection with mesodermic tumors, the embryonic origin of this group can be shown, but it is not necessary to repeat them. It will be sufficient to remark that it is susceptible of ample demonstration.

Then, since complex tumors of the testicle clearly have a congenital origin, and since no absolutely differential characteristic between complex and pure tumors can be found, we are forced to the conclusion that all true tumors of the testicle are products referable to a vice of embryonic development. Relying upon this fact then, Messrs. Monod and Arthraud have deduced the following rational classification of neoplasms of the genital gland.

CLASS I.— <i>Teratoma</i> s.—Tumors developed from the three layers of the blastoderm.	Foetal inclusion.			
	Dermoid cyst.			
CLASS II. <i>Mixed Tumors</i> .—Tumors developed from two layers or from elements of one only.	Endo- or ecto-mesodermic tumors.	{ Typical or atypical epithelioma.  { Typical or atypical endothelioma.	{ Sarcomatous. Myxomatous. Chondromatous. Myomatous. Lipomatous. Chondromatous. Myomatous. Myxomatous. Lipomatous.	
	Mesodermic tumors.			
CLASS III. <i>Pure Tumors</i> .	1st group (B). Tumors developed from the internal layer or its derivatives (endodermic tumors).	Adenoma Typical epithelioma	{ Benign form of cystic disease Typical mucoid epithelioma. Cystic sarcoma of the old authors. Reticulated carcinoma. Colloid — Hamatoid — Melanotic —	
		Metatypical epithelioma		
	2d group (A). Tumors developed from the middle layer (mesodermic tumors).	Endothelial type.	{ Rngioma. Typical endothelioma Metatypical endothelioma (sarcoma)	Angioma and plexiform angioma. Embryonic angioma or myeloplaxic sarcoma. Lymphangio-sarcoma. Lymphadenoma. Lymphoma. Embryonic or spindle-celled sarcoma. Lymphosarcoma. Metatypical nuclear endothelioma.
		Adult or differentiated type.		Chondroma. Myxoma. Lipoma. Fibroma. Rhabdomyoma. Leiomyoma.

This classification has not only the merit of grouping in a methodical manner the cases known at present, but it also has the immense advantage of foreseeing the existence of forms not yet described, and permitting us to connect to one another by a rational classification the scattered cases, the difficult interpretation of which has frequently caused their value to be misunderstood. It is far from being in accord with received ideas, but it is believed that later study of specimens, made in the light of the theoretical ideas advanced, will justify the general arrangement.

JAMES E. PILCHER.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

I. On the Use of the Thermopile and Secondary Batteries as a Convenient Means of Producing Electricity for Medical and Surgical Batteries. By ALEX. OGSTON (Aberdeen). The author commences by expressing his belief that electricity, the utility of which in surgery is beyond dispute, is far too seldom employed by the surgeon. The explanation of this is to be found, he states, in the extreme inconvenience attendant upon the methods of generating electricity at present made use of. Amongst other details, for instance, the Leclanché batteries are too bulky, and, being weak, too many cells are required, so that like most others they are unsuited for transport. Again the Gaiffe batteries are not easily re-charged, and in practice have been found unsuitable. The only really convenient appliance for transport—the magneto-electric induction machine—is useful only as an exciter of faradaic muscular contractions. To meet all the difficulties of the case, the author applied to Mr. J. W. Swan, the distinguished inventor of the incandescent lamp, for some suggestion, and Mr. Swan pointed out that the thermopile as a generator of electricity would probably prove to be of considerable service to the profession. A full description is given of the thermopile apparatus, from which an electro-motive force can be derived of four volts, equal, say, to seven or eight Daniell's and three or four Grove's cells, power sufficient to illuminate a small incandescent lamp. By itself, however, the thermopile is insufficient for the purposes of the practitioner, consequently a secondary battery, or as it is called, accumulator is needful, and this has been designed by Mr. Swan of a highly serviceable and portable description. For two months the author has used the apparatus, submitting it to the severest tests of practice; and he has had every cause to be satisfied with its efficacy. Its conve-

nience and superiority to any of the methods hitherto suggested, have been so striking, that he unhesitatingly recommends it in the strongest terms. The cost of the thermopile he states in a note is about £5, and each of the secondary batteries 55 shillings.—*Lancet*, April 30, 1887, p. 867.

H. PERCY DUNN (London).

**II. On the Use of Clay-Modelling in Recording Surgical Cases.** By HURRY FENWICK (London). Mr. Hurry Fenwick exhibited at the Berlin Surgical Congress in April clay models of carcinomatous prostatic disease which he had moulded antemortem from patients upon whom he had been forced to perform colotomy against impending obstruction. He submitted the "method for criticism as a simple and reliable means of estimating the due shape and proportion of the gland in health and disease, as well as to allow of a permanent record being kept of the microscopical changes which may ensue in the course of a prostatic complaint." He complains that the rectal surface of the gland (*i. e.* the clinical prostate) has no fixed or accurate normal standard by which to compare the pathological deviations, and he believes that this method will permit of a normal standard being found.

The *modus operandi* is to model with the left hand while the right index is examining, and when the model nearly corresponds, to correct it finally by passing the right index over the prostate piece by piece whilst the left is correspondingly passed over the rough model. "The living and the dead clay are thus compared, and it is curious how well, how accurately the two forefingers work together if their movements be simultaneous. Any mistake either of elevation or depression is immediately recognized and altered with ease." A little oil on the surface of the clay model making the moulding easier. (Author's abstract).

**III. On the Administration of Carbonate of Lime as a Means of Arresting the Growth of Cancerous Tumours.** By PETER HOOD, M.D., (London). Dr. Hood wrote a paper some twenty years ago on the action of carbonate of lime, and since that



time he considers that the result obtained by its use has been sufficiently remarkable to justify him in again bringing the subject before public notice. Sir Spencer Wells had used carbonate of lime in the treatment of uterine fibroids and other tumours. He explained its action, which he said consisted in causing atrophy and calcification, by bringing about atheromatous changes and subsequently calcareous degeneration in the vessels supplying the growth. Dr. Hood insists upon the persistent use of the drug if any benefit is to result. He thinks that the ordinary history of cancer is such a dismal one, that such a harmless remedy should at any rate be fairly tried. At the same time he throws out a caution that innocent tumours should not be mistaken for malignant ones and errors thus arise. He concludes: "It is therefore not in cases which admit of any reasonable doubt of their nature that I would desire to urge a trial of the lime powder upon the profession. There are hundreds of instances of unmistakable cancer in which an operation, if performed, may perhaps for a time diminish suffering or may prolong life, but in which it cannot afford any well grounded hope of restoration to health. For all such I would say that the lime ought to be persistently and fairly tried. It can do no possible harm, it need not interfere with any remedies for the present relief of pain, its action can be referred to a perfectly intelligible and probable hypothesis, and it has been of unquestionable utility in a sufficient number of cases to warrant us in reposing some confidence in its use.

In the same number of the *Lancet* is a paper containing the report of six cases of malignant disease of the jaw under the care of Mr. Page, of Newcastle-on-Tyne. The result was return of the disease, one within four months, one within five months, three within seven months.—*Lancet*, May 7, 1887.

H. H. TAYLOR (London).

**IV. A Comparison of the Surgical Diseases of the White and Colored Races.** By L. McLANE TIFFANY, M. D. (Baltimore). This paper, which the author states to be preliminary in character, is based upon a study of 4,930 cases, of which 64% were white and 36% negro, including mulatto. He has observed that the

difference in the behaviour of the two races under surgical disease varied in hybrids according to the amount of white blood which they possessed. As a result of his study he suggests: (1). Surgical affections pursue different courses in the white and colored races under identical hygienic surroundings. (2). Surgical operations and injuries are better borne by negroes than by whites. (3). Surgical diseases involving the lymphatic system, especially tubercular, are more fatal in negroes than in whites. (5). Surgical differences between negroes and whites are due to racial peculiarities.—*American Surgical Association, 1887.*

**V. Puncture of the Heart in Chloroform Narcosis.** By B. A. WATSON, M. D. (Jersey City). This paper is an experimental study based upon sixty cases in which the operation was done in dogs, and concludes: (1). The puncture of the heart, especially of the right ventricle, stimulates the muscular contractions, and may be advantageously employed in the treatment of chloroform narcosis. (2). The best results are obtained when abstraction of blood from the cavity of the ventricle is combined with the stimulating effects produced by the entrance of the aspirator needle. 3. The puncture of the right ventricle is a safer and more efficient operative procedure than puncture of the right auricle.—*American Surgical Association, 1887.*

#### HEAD AND NECK.

**I. A Case of Trephining in Intra-Meningeal Hæmatoma with Hemiplegia. Recovery.** By S. T. ARMSTRONG, M. D. (U. S. Marine Hospital Service). A negro, æt. 53, was struck on the left forehead by a brick, the edge of the missile producing an irregular lacerated wound, about one-half inch above the external edge of the eyebrow. The wound healed well under antiseptic dressings in fifteen days, but the patient continued to be troubled with a roaring in the head. About a month later, the roaring still continued, and a slight dragging of the foot appeared; on examination a few days after, the presence of *arcus senilis* was noticed; the pupils were small, but responded well to light, and a later examination showed optic neuritis affecting both eyes; the right ear heard the watch at six inches,

the left at three; the tongue was protruded straight, and the facial muscles were not involved; muscular power of hands apparently the same. Two days later still, the right arm was found to be less powerful than the left. The symptoms indicated a cortical cerebral lesion, affecting the middle frontal convolution—which lay beneath the site of the original injury—and extending upward and backward, gradually involving the ascending frontal convolution; the lesion seemed thus circumscribed, because if it involved the inferior frontal convolution, aphasic symptoms would have been present. In view of the fact that the patient presented chilly sensations every morning, that the wound had been somewhat septic in character, and that the development of the hemiplegia was slow and late, it seemed probable that septic matter had been absorbed and an internal purulent inflammation developed. After proper preparation then, an incision was made through the frontal scalp, and a button of bone removed, hæmorrhage from a small branch of the meningeal artery being controlled by hot water. No intra-cranial fracture of the bone was found, but the dura mater was dark and had no communicated pulsation from the brain. Dark brown blood, but no pus, was brought out through the needle of a hypodermic syringe, and the matter continued to be ejected from the puncture when the needle was withdrawn; assisted by the pulsations of the brain, this continued when the opening was slightly enlarged, until almost all the fluid was evacuated. Drainage was then secured by disinfected horse hair, the wound dressed antiseptically, and the patient passed on to a perfect recovery.—*Jour. Am. Med. Assn.*, June 18, 1887.

**II. Operative Relief of the Deformity Termed "Pug Nose."** By JOHN O. ROE, M. D. (Rochester, N. Y.). Recognizing that this deformity is due to the disproportionate size of the end of the nose, the author brings it into symmetrical proportion with the bridge by the following operation. After deadening the sensibility of the interior of the end of the nose by cocaine, general anæsthesia being unnecessary, and brightly illuminating the part, the end of the nose is turned upward and backward and held with a retractor by an assistant, while sufficient of the superfluous tissue is removed or dissected

out to allow the nose to conform to the desired shape. If the tissue is to be removed from that portion where the mucous membrane is not too firmly adherent, the membrane should be dissected back to be replaced after the operation. In some cases, no after-treatment is required, but in others it is advisable to mould a saddle or splint to the top of the nose, so as to make it assume the desired form while healing. Where the deformity is due to a malformation of the cartilages of the ala bulging outward with a corresponding concavity on the inside, the nose can readily be moulded into a handsome shape by cutting, with a tenotomy knife, through these cartilages in different places, sufficient to destroy their elasticity; then by inserting a silver or hard rubber tube of the proper size and shape into the nostril, and conforming the saddle to the outside of the nose, it is encased in an inside and outside splint that compel it to conform to the exact shape desired. The author has operated in five cases with uniformly excellent results.—*N. Y. Med. Rec.*, June 4, 1887.

**III. A Consideration of the Results in Three Hundred and Twenty-seven Cases of Tracheotomy, Performed at the Boston City Hospital from 1864 to 1887.** Drs. R. W. Lovett and John C. Munro, in the July number of *The American Journal of the Medical Sciences*, present an elaborate detailed study of the results of tracheotomy at the Boston City Hospital. They show that the results of operation in the series of cases studied are above the average in spite of the predominance of bad cases. They show that young children are especially liable to have extension of the diphtheritic process to the bronchi and lungs; in fact, that the chances are three to one that if they die they will die of suffocation. That, in Boston, tracheotomy at the hospital is most fatal at those times when diphtheria is most fatal in the whole city, and incidentally that the mortality per cent. from croup and diphtheria in the whole city vary by the month in unison. That cases with membrane in the pharynx at the time of operation are more likely to die than those where it is not present. That the mortality per cent. after tracheotomy rises steadily as the operation is done on the first, second, third or fourth day of the difficult breathing. That nasal discharge, albuminuria, and enlarge-

ment of the cervical glands, are symptoms of less moment than the character of the discharge from the trachea tube, which is the most important index of the progress of a case, and that the recovery-rate varies nearly 50% between cases where the discharge is loose throughout and those where it is gummy at any time.

Finally, for purposes of comparison, they present a table of all available reported cases of tracheotomy, arranged according to countries. The average of recoveries in 21,853 cases was 28% and of 1,327 American cases the average number of recoveries was 23%.

JAMES E. PILCHER (U. S. Army).

#### IV. Case of Thyrotomy for Epithelioma of the Larynx.

W. R. H. STEWART (London). Patient *æt.* 45. Sweep from boyhood. Family history good. Difficulty of breathing for six months; paroxysmal cough; loss of flesh. Laryngeal stridor, harshness of voice; severe attacks of dyspnoea. No enlarged cervical glands. Laryngeal examination revealed a rather large, irregular growth, springing from below right vocal cord, and projecting across the larynx. A portion removed by laryngeal forceps showed it to be epithelioma. A preliminary tracheotomy was performed, and when the patient was sufficiently recovered thyrotomy was practised. The thyroid cartilage was divided and the growth removed, and remaining part being scraped away, and solid nitrate of silver applied. The *alæ* were then carefully brought together with silver wire, and antiseptic dressings applied. The patient made a good recovery. The patient was soon lost sight of, so that as yet nothing is known of any recurrence. Mr. Stewart advocates this method of treatment rather than the severe one of excision of larynx. He is also in favor of preliminary tracheotomy, and feeding by rectum for the first few days.—*Lancet*, May 21, 1887.

V. Case of Excision of Larynx. W. GARDNER, M. D., C. M. (Glasgow). J. M., *æt.* 60 years, shoemaker, always healthy. No syphilis. No family history of disease. Two years ago he lost his voice entirely, and it has never returned. Voice gradually became weaker, till at the end of four months he could only speak in a whisper. Four months ago he experienced a sharp, gnawing pain over

larynx. Had a long course of iodide of potassium with no result. Emaciation, debility, with want of rest. Can take food, but deglutition causes pain. No absolute aphonia. Laryngoscopic examination showed both vocal cords ulcerated away in nearly their entire length. Irregular, white papillomatous nodules were projecting into the centre of the larynx from the sides immediately below the glottis. The false cords and the mucous membrane above were very much inflamed and bulged out by a solid growth beneath, more marked on the right side than on the left. Arytenoid cartilages not swollen or abnormally red; posterior commissure not thickened. Epiglottis and parts above free from disease. No enlarged glands; larynx freely movable. A small piece of growth removed and proved to be "a cornifying epithelioma." The whole of the larynx was removed. The patient made a good recovery, and an artificial larynx was afterwards applied. However, about five months afterwards the growth returned and the glands became affected. Dr. Gardner draws attention to the following points in the operation of removal of the larynx: (1). The ease by which the blood can be kept out of the trachea by the rectangular tube made the full diameter of the normal larynx, and inserted immediately after the division of the trachea, thus lessening greatly the risk of septic pneumonia. (2). That "the hanging head" position is also of immense advantage. (3). That it is probable in the great majority of cases that Gussenbauer's original artificial larynx is the best, although the straight upper tube seems to have suited the late Dr. Foulis' case. —*Lancet*, May 7, 1887.

H. H. TAYLOR (London),

**VI. Œsophagotomy for a Half Penny Which had Ulcerated into the Bronchus. Recovery.** By Mr. BENNET MAY (Birmingham). The patient was a child, æt.  $7\frac{1}{2}$  years; three and a half years before he had been seen to swallow a half-penny, and since then had suffered from œsophageal obstruction, progressive emaciation and chest symptoms. No attempt at removal had been made. On examination he was found reduced almost to a skeleton; weight,  $25\frac{1}{2}$  pounds. Swallowing very imperfect, with regurgitation of the most of it, voice hoarse, breathing stridulous, impaired resonance and deficient



breath sounds all over right side of chest. With a sound some obstruction detected above manubrium sterni. After several trials a No. 3 gum catheter was passed into the stomach and liquid food administered. Next day the child withdrew it, but swallowing was temporarily improved. The passage of this catheter was repeated twice within the fortnight when it could no longer be passed, and an operation became necessary, Œsophagotomy was performed as low as possible in the neck, and the edges of the wound in the œsophagus one and a half inches in length were held aside by wires passed through them. The finger in the œsophagus then detected a coin lying obliquely to the right of that tube, covered and obscured by its coats, *i. e.*, outside of it. After a careful incision the coin was seized and withdrawn through the œsophagus, although with difficulty, owing to its being firmly embedded. When disturbed a rush of air through the second œsophageal wound revealed a fistulous opening into the bronchus. No sutures were used at all. As no tube could be passed by the mouth into the stomach, alimentation was at first entirely rectal. This proved insufficient, and on the fourth day three ounces of milk were allowed to be cautiously sucked down, but half was regurgitated through the wound in the neck, and a little passed into the bronchus. More was taken in the following days, but as more was regurgitated the wound was kept from healing. On the fourteenth day the boy learned how to swallow a soft rubber catheter, and being thus fed, his wound improved, and in six weeks from the operation was healed. He had then only gained one pound in weight. On the seventh week he had an alarming attack of obstruction, probably from fœcal accumulation due to impaired digestion. This yielded to abstinence and enemata, and he then improved much more rapidly and gained 11½ pounds in the next six weeks. From this time his progress was only interrupted once or twice by his ravenously biting large pieces of unchewed food and partly choking on them. No tube could be passed but he was easily able to swallow a 12 or 13 soft catheter, and no symptoms of obstruction could be detected. In his concluding remarks, Dr. May points out that "this case is quite unique in the length of time intervening between the impaction of the foreign body and its successful

extraction, and also in the situation from which it was removed."—*Brit. Med. Jour.*, May 21, 1887.

CHAS. W. CATHCART (Edinburgh).

#### GENITO-URINARY ORGANS.

**I. Manipulation Without Incision as Possible Treatment in Certain Cases of Stone in the Kidney.** W. H. BENNET, F. R. C. S. The patient had for some time been suffering from symptoms of stone in the left kidney. As she was very thin and the kidney could be easily felt through the abdominal walls, she was placed under the influence of an anæsthetic and the kidney freely manipulated. When she recovered from the chloroform she complained of a little aching, but was able to walk home. Two days later she reappeared, and it appeared that on reaching home after the manipulation she was seized with an attack of renal colic which lasted some hours, after which she got complete relief.

Though so far only this one case is recorded, it is suggested that the plan is worthy of trial in certain cases.—*Lancet*, 1887, May 21, p. 1,026.

**II. Removal by Abdominal Section of a Large Sarcoma of the Kidney, Which had Undergone Extensive Cystic Degeneration. Recovery from the Operation. Rapid Recurrence of the Disease.** By C. T. CULLINGWORTH, M. D. The patient in question was supposed to be the subject of an ovarian cystoma. After admission, and even on reviewing the symptoms and signs carefully after operation, it was difficult to see what other conclusion could have been come to.

As soon as the abdomen was opened, it became clear that the tumor was situated behind the peritoneum, and on further examination that it was renal. The pedicle was treated in the same way as an ovarian pedicle, and the edges of the peritoneum were brought together and placed in apposition. All went well for some days, but a month later there were signs of fluctuation posteriorly, and some pus with the sloughed pedicle escaped eventually from an incision that was made posteriorly. Complete healing then ensued. The tumor

proved to be a sarcoma. About six months later two nodules appeared in the site of the old scar.—*Med. Chron.*, Nov., 1886.

W. BRUCE CLARKE (London).

**III. A Case of Nephrolithotomy.** By D. HAYES AGNEW, M. D. (Philadelphia). A man, aged 37, had suffered pain in the left lumbar region for more than two years, and at one time there was a small well-defined swelling there; under a tentative diagnosis of renal stone, an exploratory lumbar section was made, allowing some pus which had evidently been confined for some time about the kidney, to run out. By careful exploration of the gland, a stone was found, filling the entire pelvis and sending its prolongations into the infundibula, composed chiefly of phosphate of lime and uric acid, and weighing 275 grains. This calculus was removed, the wound closed, dressed antiseptically and drained. The patient was discharged from the hospital on the 25th day after the operation, with a slight lumbar fistula only.—*Med. News*, June 18, 1887.

**IV. Hypogastric Cystomy.** By MARC SÉE (Paris). From a careful and complete study of the subject, the author concludes: (1). After hypogastric cystotomy not followed by suture of the bladder, it is useless and dangerous to insert a retained catheter in the urethra, at least for the first seven or eight days. (2). Immediate union of the vesical wound, obtained several times, is the end towards which the efforts of surgeons should be directed in every case where success is possible. It is of the highest importance that the hypogastric wound should be as clean and regular as possible. (4). The various modes of drainage of the bladder have not the importance which has been attributed to them. (5) The abdominal decubitus and the lateral decubitus give excellent results and should be tried more frequently than heretofore. (6). The accessory means of protecting the wound (suture of the bladder with the skin, antiseptic powders and gauzes, irrigation, continuous baths, etc.) may be utilized with advantage.—*Revue de Chirurgie*, Feb., 1887.

**V. Suprapubic Lithotomy.** By FREDERIC S. DENNIS, M.D., (New York). This paper opens with a historical introduction assign-

ing the first description of the operation to Franco, but incorrectly giving it the date of 1561 instead of 1556, which has been shown in this journal (vol. ii, page 174) to be the correct date. The greater portion of the paper is devoted to a discussion of the technique of the operation. The parts being shaved and rendered aseptic, and the rectum being emptied by a cathartic and an enema, the colpeurynter is introduced through the anus, and dilated by injection slowly of about 12 ounces of warm water or less according to the age of the subject. The bladder is then distended by the injection of about 6 ounces of boro-salicylic solution. If a silver catheter is used for the injection, it may be left in place, plugged to prevent the exit of the solution and also be used as a guide to cut upon, when the bladder is exposed. An incision, 3 to 4 inches long, beginning at the pubis and extending upward, is advised. Having reached the prevesical space, the edges of the wound may be retracted by the use of an eye speculum, and the fingers inserted into the wound to feel the bladder; the prevesical cellulo-fatty tissue should be separated with the handle of a scalpel, the bladder exposed, seized with two delicate tenacula, and opened between them. He considers drainage through a perineal opening worse than unnecessary, for it may be obtained with perfect satisfaction by a rubber catheter in the urethra, a rubber tube in the wound or by the abdominal decubitus; and he is convinced that in the majority of cases the bladder should not be sutured but be left open to heal by granulation.

The special indications for exploration of the bladder by suprapubic method are found: 1. In cases of lithotomy for large hard calculi, also in lithotomy occurring in a patient suffering from paraplegia, a contracted pelvis, perineal tumors, encysted calculi, ankylosis of the hip, hæmorrhoids or great obesity. 2. For the removal of certain foreign bodies, as hair-pins, bodkin needles, etc., for the treatment of chronic cystitis and for the removal of calculi in the female. 3. In lithotomy occurring in a patient with greatly enlarged prostate, or with fibroma of the prostate, or in calculi lying in diverticula behind the prostate. 4. For the excision of tumors of the bladder. 5. For rupture of the bladder.

The special advantages of the operation may be enumerated as follows: 1. The safe removal of large hard stones which cannot be removed by any of the other methods. 2. The avoidance of perineal hæmorrhage, of urinary infiltration, of perineal fistula, of laceration of the rectum and neck of the bladder, the prevention of traumatic stricture and cystic hæmorrhage. The avoidance of any interference with the genital apparatus. 3. The prevention of a vesico-vaginal fistula in young women, or of permanent incontinence of urine in aged women. 4. The safest operation in all forms of renal disease, and the only means of saving life in rupture of the bladder. 5. The tendency to recurrence of stone is much less than by lithotripsy. Its extreme simplicity, its present reduced rate of mortality, its freedom from danger during its execution and its safety for the general practitioner in comparison with the perineal operations or lithotripsy.

He has collected 127 cases operated on since 1879, with a mortality attributable to the operation, of 11, or 9%, which is not high in view of the facts that (1) the causes of death in the majority of cases are due to septic infection and not the immediate effects of the operation itself; the employment of more rigid antisepsis for the bladder should improve this mortality; at the present time there is no ideal antiseptic especially and peculiarly adapted to vesical surgery and he recommends attention to this point. (2) The largest and hardest stones have been reserved for the high operation. The patients have been, as a rule, in poor physical condition. Improvements in the details of bladder antisepsis and extension of the limits of the high operation to include stones of a smaller size, but not to embrace those suitable for litholapaxy, and an earlier period of operation before patients are exhausted from chronic vesical irritation will reduce the rate of mortality so as to compare favorably with any other cutting operation for stone.—*American Surgical Association*, 1887.

**VI. Suprapubic Cystotomy for Purposes Other than the Extraction of Calculi.** By JOHN H. PACKARD, M.D., (Philadelphia). After a review of the history of hypogastric vesical section, the author cited a number of cases in point, which may be tabulated as follows:

<i>No.</i>	<i>Age.</i>	<i>Date.</i>	<i>Cause.</i>	<i>Details and Complications.</i>	<i>Result.</i>
1		1833	Hair pin passed per urethram.		Cure.
2	85	July 7, 1835.	Retention due to enlarged prostate.	Drainage through the wound with a glass ovariectomy tube bent like a tracheotomy tube.	Decided improvement, but death two days later from heart failure.
3	43	July 21, 1885.	Retention from old stricture and perineal abscess.	Incision of abscess allowed a catheter to pass into the bladder, but distention recurring; a suprapubic incision allowed a catheter to pass through the neck of the bladder out of the perineal wound. A large mass of slough came from the abdominal wound on the seventh day, which was followed by rapid improvement.	Cure in three months
4	43	July 4.	Retention for four days.	Penis, scrotum and skin of the abdomen swollen and tense. Five incisions.	Cure.
5	63	Aug. 13, 1886.	Retention from enlarged prostate.		Improvement but death from exhaustion on the 16th day.
6	70	April 24, 1887.	Retention from enlarged prostate.	Drainage with rubber tube in wound. Casts and albumen in the urine.	Typhoid condition developed, resulting in death on the 14th day.
7	40	April 24, 1887.	Retention with double inguinal hernia and double hydrocele.	Drainage with rubber tube in the wound.	Urethral obstruction gradually passing away.

As regards the method of procedure, he believed that the fullest antiseptic precautions should be observed in these cases. In most of his cases, the question of distention of the bladder was not considered, as the organ was already in danger of rupture from excess of urine; however, it should never be more than moderately distended by the employment of not over six or eight ounces of a boric acid solu-



tion; the solution may be conveniently retained in the bladder by folding the urethra and retaining it so. There is less risk and more advantage in distention of the rectum, for a possible source of danger is obviated by thus preventing the sinking of the bladder into the pelvis until all the arrangements for drainage have been completed. The steadying of the bladder by an assistant when an incision or puncture is to be made, is not only needless but objectionable. The incision through the skin should be free enough to give ready access to the deep parts; in fat persons, about 3 inches and in the thin about 2 inches; no vessel of any importance can be encountered if the incision is made in the median line. Before opening the bladder, it is necessary to secure it in some manner lest it collapse and settle back on puncture, and greatly embarrass the operation; for securing it a small double hook set at a right angle on a stem, or even a small tenaculum may be used to advantage, and in case of a large vesical opening, a double ligature is perhaps the most useful. In cases of retention, the curved trocar and canula may now be used at once, the canula being afterward replaced by a tube; the author makes the opening just large enough for the tube. The proper point for the opening is at the middle of the exposed portion of the vesical wall, which would be about 1 or  $1\frac{1}{2}$  inches above the pubes, and thus avoid the peritoneum on one hand and the sinking of the opening below the pubes when the bladder contracts, on the other. Drainage should be provided through a soft rubber tube of a length to be determined for each case, but it should go well into the bladder even when the organ is collapsed and should have lateral openings only near its inner extremity; the external end may be closed by a cork or clip or by bending it; in old men with atonied bladders, he had used glass tubes. He did not favor the prone attitude to facilitate drainage, because of the discomfort it occasioned. If the opening into the bladder has been large, it may be drawn about the tube by two or three catgut sutures. The lips of the external wound should also be brought together by catgut or silkworm gut sutures. He concludes with the following pertinent question: "If the suprapubic operation had been first tried and generally adopted is it likely that the perineal operation would have been afterward per-

formed on account of its greater ease, simplicity and efficiency?"—*American Surgical Association*, 1887.

**VII. Operations for Vesical Calculi.** By A. VAN DERVEER, M.D., (Albany, N. Y.). This paper presented 41 cases in which the author had operated for stone in the bladder: they represented every kind of stone as to location in the bladder—prostatic, membranous and the spongy portions of the urethra; as regards the formation of soft and hard calculi, the list was singularly complete, while the extremes as to size were remarkable. There were seven cases of perineal lithotomy with two deaths and five recoveries, the former being very old men with very large stones. Of attempted litholapaxy and immediate perineal lithotomy, there were two cases, both of which resulted in death, being severe cases of large stone, the patients presenting a history of much suffering through many years. Of dilatation of the urethra in the female and washing out of fragments or removal of stone entire, there were six cases, all recovering with no complication whatever. Of urethral calculi, there were four cases, all recovering. Of simple lithotrity in the male, there was one case followed by recovery. Of litholapaxies, attempted but not completed, there were four cases, three ending in death and one, in which the stone was hidden in a sac, later undergoing perineal lithotomy and recovering. One was probably complicated with some form of tumor of the bladder with a history of chronic disease of the kidneys; one was a case of chronic alcoholism; one was complicated with sacculated bladder, and the last two were cases of surgical kidney of the gravest kind. Of the litholapaxies in the male, there were eighteen patients and twenty-two operations, four required a second operation; of the number, sixteen recovered and two died; of the latter one died after the first and one after the second operation.

Litholapaxy is indicated in cases where the stone is small or of moderate size, and can be done in very small children, with proper instruments. However, there is much that is wanting in the study of the condition of patients after rapid lithotrity, and valuable statistics on the subject ought soon to have accumulated, but the fallacy of all

tables must be remembered, since many cases never return to the first operator.

As regards suprapubic lithotomy, in view of the excellent results always likely to be obtained from litholapaxy, it must necessarily deal with severe cases of large, and, in some cases, sacculated calculi. In cases where severe cystitis coexists in male adults, regardless of the size of the stone, suprapubic or some form of perineal lithotomy is the best operation, in which case the cystitis can be treated, and there is less danger of a recurrence of the stone; he believed that future statistics would show that cystitis had much to do with the necessity for a second or third operation. Suprapubic lithotomy must in some instances be embarrassed by contracted bladder with adhesions in the male, which he believed had not received the attention it deserved. On anatomical grounds, the suprapubic operation is the more simple in youth because of the greater height of the bladder in the pelvis at that age. In girls, suprapubic lithotomy or rapid dilatation will undoubtedly reach all cases, and in women vaginal lithotomy may be added. He presents a table of recorded cases of suprapubic operations, showing in 142 adults, a mortality of 22%, and in 113 children under 15 years of age, a mortality of 10.5%.

W. T. BRIGGS, M.D., (Nashville, Tenn.) believed that no special operation is adapted to all cases, but that each should be scrutinized with care and subjected to the particular operation best suited to it. There is no doubt but that the suprapubic operation is best for a certain number of cases, such as stone too large to be brought through the pelvis without tearing and bruising the soft parts, or where there is a deformity of the pelvis or an injury of the limbs, which will not permit them to be brought into the proper position for operation. He did not think the operation could be considered as so innocuous as did Dr. Dennis. The lateral operation is so safe as to be attended with almost entire success in children—the bladder is easily reached and at a point where it is naturally most easily drained and where the wound is most easily healed. The mortality increases of course with the age of the subjects. But the operation in the median line in the raphé, which is merely a seam holding the other parts taut and which on division

permits dilatation of the parts on either side to almost any extent, is the best. Any danger from the neck of the bladder being firm and resisting, can be easily overcome by making a little incision on either side into the prostate gland, dividing the gland and the mucous membrane, which permits the parts to be dilated sufficiently to remove any stone which can be brought out of the pelvis. Too large a stone to pass out of the pelvis can be crushed by an instrument inserted through the incision. He had no doubt but that a clean operation in this manner would have a less mortality than litholapaxy. Previous to his adoption of the median operation, he had operated upon 45 cases, 40 by the old method of Dupuytren with the lithotome. Then he adopted the median operation which is substantially that of Civiale, and, taking all kinds of cases at all ages, his first 74 were without a death; then he had two deaths, the case being complicated in one with a pelvic abscess, and the other by scrofulosis. Then followed 46 cases with one death, the patient dying, with the wound ununited, of general tuberculosis three months after the operation. In the two years immediately preceding, he had operated on six old men with an average of sixty-six years, all of whom recovered; and he believed that in properly prepared and suitable cases, skilfully operated upon, the mortality will be nothing.

D. HAYES AGNEW, M.D., (Philadelphia) considered the median operation unquestionably the safest of all operations in the perineum, thought that the substitution of antiseptic solutions for the warm water formerly employed would render it still safer, and believed the old procedure to be the operation of the future. A similar opinion was expressed by Dr. J. R. WEIST, M.D., (Richmond, Ind.), while W. A. BYRD, M.D., (Quincy, Ill.), remarked that perineal lithotripsy obviated the necessity of tearing the soft parts in removing a stone, and presented a crushing instrument for the purpose.

H. H. MUDD, M.D., (St. Louis, Mo.), called attention to the inapplicability of the suprapubic operation in cases of chronic cystitis with firmly contracted bladder, and related cases in illustration.

J. COLLINS WARREN, M.D., (Boston), had seen two successful cases of suprapubic lithotomy during the preceding year, one for stone, the other

for tumor. He related a case in illustration of one advantage of the hypogastric method, in which perineal section for recurrent calculus was followed permanently by ejaculation of semen into the bladder. He referred to the popularity of litholapaxy in Boston, and emphasized the necessity of removing the debris in this operation.

T. R. VARICK, M.D., (Jersey City), thought the size of the stone had been made too much of a bugbear in perineal extraction, and presented a stone, weighing 7 ounces and 4 scruples, removed by the bilateral method from a boy of 14, without perceptible laceration; he also referred to the use of hot water as a styptic and aseptic.

D. W. YANDELL, M.D., (Louisville) had performed 92 operations by the perincum, 8 by lithotrity and 6 by litholapaxy; he had seen two suprapubic operations but could as yet see no advantages in that method over the old ones. There were 7 deaths after his lithotomies and no recurrences, after the lithotrities there were 2 recurrences and 2 after the litholapaxies.

J. B. ROBERTS, M.D., (Philadelphia), could not change the opinion expressed by him three years previously that the high operation was destined to become an important one; it is safer for the inexperienced surgeon and better for exploratory purposes and the removal of tumors. He thought it however a rather severe method of treating retention from stricture, in which aspiration will generally on the second or third day at least, permit the passage of an instrument through the urethra.

J. E. MICHAEL, M.D., (Baltimore), had had considerable experience in the treatment of retention from stricture or prostatic disease, and had found suprapubic aspiration all that was necessary and with proper precautions safe. For exploratory purposes and in some cases for foreign bodies, there is no question of the propriety of the high operation, but for most cases of stone and for prostatic trouble, perineal section is preferable.—*American Surgical Association*, 1887.

JAMES. E. ILLCHER (U. S. Army).

## BONES, JOINTS, ORTHOPÆDIC.

### I. Dislocation of the Hip. By HENRY MORRIS, F. R. C. S.

(London). This article was written in consequence of a lecture delivered by Prof. Humphry in which he used the following words: "It has lately been maintained, on insufficient grounds, I think, that dislocations of the hip backwards are always, or almost always, indirect; that the head of the bone escapes from the acetabulum close to the transverse ligament, and is then, if the limb be in an inverted position, carried backwards, and perhaps upwards. Furthermore, it is held that the accident occurs during the abducted position of the limb." Mr. Morris some years ago paid especial attention to this point, both by actual experiments and dissections on the cadaver, as well as by examination of museum specimens. He also was fortunate enough to see several cases in actual practice. From these he came to the conclusion that: (1). In the regular backward dislocations (*i. e.*, dorsal and sciatic) the head of the femur leaves the acetabulum in a downward or downward and backward direction through a rupture in the thin part of the capsule, and is carried upwards to its position on the dorsum ilii or ischium. In other words, that these dislocations (when not complicated by fracture of one or both bones of the joint) are indirect in the sense that the head of the femur ascends to its position after having burst through the capsule at a lower point. (2). The thin part of the capsule is all that portion of it, except the narrow pubo-femoral band which is below and between two imaginary lines—namely, one drawn from the inferior iliac spine to the small trochanter, and the other from the upper part of the tuber ischii to the digital fossa of the femur. (3). During abduction the head of the bone bulges against the thin portion of the capsule, and that in this position dislocation most easily occurs. The mode of occurrence of backward dislocations described in No. 1 affords the only rational explanation of the ease with which dorsal and sciatic dislocations are reduced, or converted into the pubic variety, by manipulation. Prof. Humphry drew attention especially to the following points: (1). The position of the rent in the capsule by which the head of the bone escapes from the acetabulum—namely, at the lower and back part, behind the pubo-femoral ligament, therefore not at the lowest part, although the weakness of the capsule here may seem to predispose it to give way in this situation. (2). That disloca-



tion occurs commonly, and not as recently suggested, when the limb is abducted, but when the thigh is adducted, flexed and inverted. (3). That the dislocation is not indirect, but direct, the head of the bone being driven through the capsule at the lower and back part of the joint, and then carried up to a variable extent by the force which caused the dislocation. Mr. Morris agrees with the first and third conclusions if the word "indirect" and "direct" be transposed in the third. He quite denies the second conclusion. Prof. Humphry says that the probabilities are, of course, that the limb will be in an habitual or natural position when an accident occurs, and the position of flexion, adduction, and inversion, is both an habitual position and is one in which the head of the bone is pressed against the part of the capsule (the under and back part)." Mr. Morris contends that abduction is a usual and natural position, and also that in that position the head of the femur is pressed against the thin part of the capsule. Mr. Morris cites cases in which the accident did occur during abduction of the limb. He finally points out how the recognition of the fact that the injury which dislocates the femur onto the dorsum illi acts indirectly on the bone influences our employment of manipulation in its reduction to the exclusion of the old method of reduction by direct means, viz., the use of pulleys.

H. H. TAYLOR (London).

**II. A New Method of Immediate Retention in Fractures of the Tubular Bones.** By DR. H. BIRCHER (Bern). Despite our very complete methods of treating fractures there are cases that resist every effort, and even though reduction is accomplished it cannot be retained either by dressings or weights. This is especially the case where the soft parts are not in condition to bear the pressure of a dressing or there is no suitable chance to apply extension. Here direct instead of mediate retention must be practiced. Various methods of achieving this have been used: Malgaigne's hook's, Dieffenbach's metal plugs with circumvolute suture, screws, bone suture, etc. Such methods have, however, rarely been applied to fresh fractures. Within a few years B. has treated a number of fractures of the lower extremity after another plan. This consists in the introduction of ivory

plugs into the marrow cavity of the diaphysis-ends, or in case of the epiphyses in the application of an H-shaped ivory clamp to the bone walls.

1. Man of 36. Simple fracture in diaphysis of left femur with large extravasation. Slight consolidation after three weeks; the hematoma not resorbed; 5 ctm. shortening. The injury was then exposed, the hematoma cleaned out, bone edges smoothed, a plug introduced, and a capsular dressing applied. Good consolidation in four weeks. Removal of the plug by chiseling out an opening in the front wall of the fractured part. Cured in 69 days, with scarcely 1 ctm. shortening.

2. Drinker of 36 years. Compound oblique fracture of leg. Ligation of the anterior tibial artery for hemorrhage. Neither a retentive dressing nor extension was possible. An ivory plug was introduced and a capsular bandage applied. No fever. Slow consolidation. Plug removed in four weeks. Discharge with a small fistula, but no shortening at end of four and a half months.

3. Woman of 22. Compound fracture in lower third of left leg. Much contusion and infiltration. Antiseptic dressing and extension. Inflammation and necrosis at seat of injury. No consolidation, but marked shortening after three weeks. Ivory plug, etc. Fever, pain and suppuration were thus relieved. Plug removed in four weeks. First attempt at walking toward end of third month. Firm union. No shortening.

4. Man of 45. Compound comminuted fracture of left leg with much contusion. Suppuration set in. Operated five days later. The blood clots and a free piece of tibia were removed. The remaining bone was fissured, and at its lower end dislocated. After some smoothing of the surfaces an ivory plug was introduced. Consolidation despite suppuration. Plug removed in three weeks. Some further pieces of the tibia came away, but a good cure with scarcely 2 ctm. shortening was achieved after several months.

5. Man of 24. Compound fracture of lower epiphysis and diaphysis of left leg, passing up and outwards from the internal malleolus. The soft parts were greatly contused. Inflammation developed at the point of injury. He grooved the spongy bone—as there was no

marrow cavity at this point—and applied the ivory clamp. This was removed in five weeks. First attempt at walking in three months. No functional loss.

The ivory does not irritate as it is immobile. Indications: (1.) Compound fractures with rebellious dislocation which cannot be corrected by dressings or extension. (2.) Simple fractures (pseudarthroses) in which mediate retention does not succeed.

Although he was unable to find like published cases, yet Volkmann had informed him of three cases of pseudarthroses in which he had followed a similar plan with success, with the difference that he had allowed the plugs to remain.—*Arch. f. klin. Chirg.*, 1886, Bd. 34, Hft. 2.

WM. BROWNING (Brooklyn).

**III. On Some Elements of Success in Excision of the Knee-joint.** By W. THORNLEY STOKES, F. R. C. S. T. The author divides the flaps in the middle line as high as the synovial pouch extends, in order to thoroughly remove the latter with knife, scissors and spoon.

To avoid oozing after the operation, and consequent early change of dressings, Esmarch's bandage is not to be used, nor any tourniquet.

In order to attain more perfect fixation of femur to tibia, two silver dowels are thrust through the tibia on each side of its tubercle upwards, backwards and outwards into the femur nearly to its popliteal surface; these are withdrawn in two or three weeks.—*Brit. Med. Jour.*, April 2, 1887.

A. F. STREET (Westgate).

**IV. A Method of Fixing the Bones in the Operation of Excision of the Knee-joint.** By HOWARD MARSH (London). The author remarks that in putting up an excision of the knee, the surgeon has not only to guard against the shifting of the tibia on the femur that may be produced by the movements of a restless patient, by spasmodic action of the muscles, or by the disturbance of the limb

when the patient is lifted, however carefully, for the action of the bowels; he has also to prevent the riding of the femur in front of the tibia, which is especially apt to occur in cases in which the bones of the leg have undergone displacement backwards toward the popliteal space—to prevent the latter condition, he has for the last four or five years employed the apparatus recommended by Mr. Gant, in his *Practice of Surgery*, second edition. This consists of an outside splint and a back splint. The latter is a simple straight splint, extending from just below the tuberosity of the ischium to the commencement of the tendo-Achillis. In adaptation to the limb it is wider above than below, slightly concave and well padded; but in adjusting it pads are added to the part corresponding to the leg, so that the tibia is brought well forward and landed up, so as to be raised to the level of the femur. By this means the plan of binding the femur down to the level of the tibia, a proceeding which involves firm constriction of the thigh, and often produces œdema of the soft parts about the knee, and thus interferes with sound healing is avoided—as soon as the limb has been secured on the back splint, so that the tibia lies in easy and close contact with the femur, the bones are pinned together. Mr. Marsh uses bone pegs—ordinary bone knitting needles answering the purpose well, for these he finds with their ends sharpened, always easily introduced through orifices in the tibia made with a brad-awl, and can be readily driven to the requisite distance onward into the femur by a few slight taps with a mallet—the outside splint reaching as high as the great trochanter, furnished with a foot piece and interrupted at the knee, completes Mr. Gant's apparatus. It seems to steady the whole limb. It is applied as soon as the bone pegs have been introduced. The concluding part of the operation comprises the suturing and dressing of the wound. These steps come last, so that it can be ascertained that, when all is finished, the bones are still in proper apposition, and so that the dressings can be changed without disturbance of either the outside or the posterior splint. The pegs are cut off short at the time of the operation, and do not require further attention. The author has used the bone pins in nine cases, in each of which a very satisfactory result has been obtained. One case was a lad of 16,

who walked a distance of 120 miles, six months after the operation, in seven days.—*Brit. Med. Jour.*, Feb. 19, 1887.

H. PERCY DUNN (London).

#### IV. Transplantation of Bone for Ununited Fracture.

A. PONCET (Lyons). Patient, aged 19, with ununited fracture of tibia (compound). Thirteen months since accident. Bone transplanted between the fragments was the first phalanx of the great toe of an amputated leg (minus the articular ends).

Antiseptic precautions were taken and the graft soaked in sublimate solution before insertion. The graft lived, but the operation was not successful in securing bony union.—*Lancet*, May 28, p. 1,102.

C. B. KEETLEY (London).

### GYNÆCOLOGICAL.

#### I. On the Frequency of Malignant Growths of the Ovaries and Their Operative Treatment. By Prof. LEOPOLD.

Careful study of the finer structure of these neoplasms during the past fifteen years has demonstrated the fact that their malignant nature is much more frequent than was formerly supposed. Observations on the nature and frequency of these malignant tumors have been made by numerous authors, such as Olshausen, who reported 14 cases of sarcoma in his own practice. Cohn found among 600 ovariectomies of Schroeder 100 cases where the tumors were undeniably malignant or showed malignant degeneration. The tabulated list of these cases shows a percentage of 16.6 for the malignant nature of all ovarian tumors. This is of much importance in regard to the question of desirability of removing such malignant growths. Permanent recovery in such cases was once held to be very questionable and rare. Observations, however, of Schroeder show that 16.6% of his ovariectomies revealed malignant tumors, and that 19.5% of the operated cases of this kind remained free from a return of the disease for more than a year, *i. e.*, recovered. Cohn, therefore, concludes from this, that all proliferating neoplasms of the ovaries, even of both ovaries, should be removed as quickly as possible. If an operation be delayed until all indications, as given by Wells and others, shall have appeared, the

strength of the patient will be much exhausted and her general condition have suffered greatly; in many cases the operation will be undertaken too late, the surrounding parts having become involved by the neoplasm.

In considering the importance of this subject, and in connection with the fact that almost the fifth portion of these patients operated for malignant tumors remained healthy for longer than a year, author thinks it worthy of consideration to ascertain the number of malignant tumors found, on the average, in 100 cases of ovariectomy; how many of such were removed and how many were not removable; furthermore, how many patients died sooner or later after the operation; how many should be considered as permanently cured, and finally, of what value for future therapeutics are these observations. As an answer to these questions, author gives the results, etc., of 110 cases of ovariectomy performed by himself. In observing these it will be seen that the percentage of malignant neoplasms is a higher one than in the cases of Schroeder. On the other hand, however, the number of recoveries is highly satisfactory.

Malignant tumors were removed in 20 of these 110 completed ovariectomies, =18.1%. Add to this 6 cases where incision into the abdomen revealed the uselessness of operating (the surrounding parts having become involved by the disease), we shall have 26 malignant tumors in 116 ovariectomies, =22.4%, a number exceeding that of Schroeder by about 6%. Four of these 110 cases of completed ovariectomy died of septic poisoning, =3.6%, none of which, however, had malignant growths. Of the 26 cases with malignant tumors, 5 (or 19.1%) died from rapid loss of strength. Of the 6 cases, mentioned above, where laparotomy only was made, 3 died within the first six weeks, from loss of strength; one died immediately after the operation, one four months afterwards, whilst one recovered.

Of the 20 cases of malignant growths and in which the operation was completed, four died soon after from great loss of strength; four made a complete recovery, one and one-half to three and one-half years having now elapsed since the operation; 9 died from return of the disease, within one to twelve months afterwards. In regard to the



three remaining cases, the time of observation has been too short for drawing conclusions. No return of the disease has, however, appeared in them.

From this it will be seen that 20% of those cases with malignant growths and in which the operation was completed, made a recovery. The author, therefore, agrees with Cohn, that every proliferating ovary tumor should be removed as soon as possible. Two of these 4 cases were afflicted with very large papillary cystoma. No puncture had been made and the contents had not escaped. Examination of the serosa, especially in the cavity of the pelvis, during the operation, did not reveal any infection of these parts. The third case was one of bilateral papillary cystoma. During the two years previously, patient had been punctured four times, there escaping always some sticky, yellowish fluid. The cyst was adherent to the abdominal wall in several places and to the intestines, giving rise to much hemorrhage when tearing it off. The fact is considered noteworthy, that around the cicatrices where puncture had been made, the most luxurious papillomatous excrescences were found. The removal of the many small excrescences required great care and labor. The patient has survived for three years and shows no signs of any return of the trouble. The fourth case, that of a young woman, æt. 18, was a poor one, as the patient was greatly reduced in strength. The tumor was hard, with uneven surface and having a pedicle 20 ctm. in length. Microscopic examination showed it to be a round-cell sarcoma. No spreading of the disease to other parts was detected. Three and a half years have elapsed since the operation and the patient enjoys the best of health, showing no signs of relapse.

Author thinks that further observation on this subject, the comparison namely of benignant and malignant growths in regard to their operative removal, will eventually lead to generally establishing the rule of removing even very small neoplasms of the ovaries as soon as they show steady increase of size, and especially when they are bilateral.—*Deutsch. Med. Wochenschrift*, No. 4, Jan. 4, 1887.

C. J. COLLES, (New York).

## II. A Case of Ovariectomy Followed by Secondary

**Intraperitoneal Hemorrhage ; Reopening of the Abdomen ; Recovery.** By HENRY W. FREEMAN, F. R. C. S. T. The bleeding came from a rent in the pampiniform plexus of the broad ligament, between the uterus and the stump of the clamped pedicle. The rent was probably due to traction on the tumour in lifting it out of the pelvis before the pedicle was clamped. No bleeding occurred when the pedicle was drawn upwards owing to mechanical closure of the rent by the traction thereby exercised on the broad ligament.

The author directs special attention to the fact that he was enabled to establish his diagnosis of secondary hæmorrhage (and thus save the patient's life) by means of the glass drainage tube which he had fixed between Douglas' pouch and the lower angle of the abdominal incision.—*Lancet*, Vol. i, June 4, 1887.

**III. Total Extirpation of the Uterus by the Vagina for Carcinoma ; Recovery.** By Dr. E. C. STIRLING, of Adelaide Hospital. Having divided the inferior attachments of the uterus the operator forcibly anteverted it and drew it out of the vagina by the help of an assistant's fingers behind and a Barnes's polypus hook in front.

There was troublesome hemorrhage from the stump of one broad ligament, its ligature having slipped, and the need of strong and large artery forceps was felt.

A T-shaped rubber drainage tube and frequent antiseptic irrigations were used.

It appears that the whole of the disease was removed, but the question of recurrence must remain as the operation was performed only in September last.—*Brit. Med. Jour.*, May 21, 1887.

A. F. STREET (Westgate).

**IV. On the Control of Hemorrhage by Forceps in Vaginal Extirpation of the Uterus.** By Prof. P. MUELLER. The best method for vaginal removal of the whole uterus is still an open question. Two difficulties are met with; one the long duration of the operation, the other the uncertainty in controlling hemorrhage. These become very important, whereas frequently the patients are greatly weakened before the operation. On the basis of five cases, M. here

recommends the French method of compressing instead of ligaturing the vessels. Separation of the bladder, opening into Douglas's pouch and lateral freeing of the cervix are performed as before; but so-called reversion of the uterus is avoided. An index finger is passed through Douglas's pouch and hooked around the upper border of the lateral ligament. The finger tip thus comes out through the front opening in the peritoneum. Along this finger one branch of the forceps is passed back and down so that its tip comes out through the opening into Douglas's cul de-sac. The other forceps' arm is then inserted and the instrument locked. If one index finger does not suffice, the other must be passed in from the front, in which case an assistant adjusts the forceps. If the instrument has a firm hold, the uterus connections are severed along the inner border; whereupon the organ can be drawn down in front of the vulva, the other broad ligament treated in like manner and the uterus entirely removed. The forceps pass into the vagina only up to their locks. The vagina is washed with 1% borosalicylic and plugged with iodoform gauze for 48 hours, when the instruments are carefully opened and removed.

In the majority of cases the technical side of this procedure is not difficult. The plan controls hæmorrhage and greatly shortens the operation. The perhaps ulcerated cervix is not brought into contact with the peritoneum. The old danger from leaving instruments can be disregarded as we now know how to make them innocuous.

One of his cases ended fatally in 11 days, whether more from exhaustion or a slight peritonitis was uncertain. The others recovered, including two severe cases, one with cancerous adhesions.—*Centbl. f. Gynkgl.*, 1887, No. 12.

WM. BROWNING (Brooklyn).

**V. Hæmato-Salpingitis.** By M. TERRILLON (Paris). Four patients with this disease were successfully treated by Terrillon by the removal of the affected tubes and ovaries. The symptoms were excessive metrorrhagia—constant in some, intermittent in others—violent pains in the abdomen generally constant, nausea, vomiting, wasting and feebleness. In all four the symptoms dated from a confinement; in two of them appearing on the return of the menstrual flow (in one

of these cases there had been a difficult labour); in a third case there had been puerperal pelvic peritonitis. The tubes were found covered with false membranes, matted to the ovaries, and adherent to the pelvic peritoneum.

In three of the cases the tubes were on one or the other side, distended with blood and clots to the size of a pigeon's or hen's egg; opening closed. Generally, both were affected, and in one case, where muco-pus occupied the tubes, the ovaries had suppurated. This was the case where there had been pelvic peritonitis.

On a minute examination Professor Cornil found in the specimens from three of the patients a similar condition. The principal change occurred in the mucous membrane which was hypertrophied, its folds exaggerated to form long and multiple fringes, partly filling the cavity. Where blood distended the tubes these fringes were flattened and atrophied: where there was muco-pus the vegetations were thickened and contained numerous embryonic cells. Orifices of bell-shaped openings were closed, fringes either atrophied and gone or thick and hypertrophied. Adhesions and bands united the tubes to the ovaries and to the peritoneum. The ovaries were enlarged, substance slightly altered, surface covered by false membranes.

The condition was summed up as inflammation of the lining of the tubes, which the clinical history showed to have begun in the uterus, spread outwards and after traversing the tubes caused localized peritonitis on and near the ovary, thus giving rise to the pain there. The hæmorrhage was due to the increased vascularity of the mucous membrane, the nervous and digestive symptoms to the reflex effects of the localised irritation. The organic lesions explained the uselessness of medical treatment of the symptoms and the necessity for surgical interference.—*Le Bull. Med.*, June 1, 1887.

**VI. Gonorrhœal Salpingitis.** By M. CORNIL (Paris). M. Cornil found acute bilateral salpingitis in the case of a young woman who died of pneumonia, and who at the time was suffering from gonorrhœa. On account of the delirium the date of the gonorrhœa could not be ascertained. There was exudation in tubes with numerous epithelial cells, but no gonococci were detected, papillary vegetation

of large size and extremely vascular. Cornil thinks that vascularity is the main difference between the vegetation of this and of the simple form of salpingitis which often follows confinement.—*Le Bull. Med.*, May 29.

**VII. Laparo-Elytrotomy.** GANZINETTI. The main part of this paper is acknowledged to be taken from a pamphlet by Dr. Clark, of Brooklyn.

Contractions of the pelvis necessitate two distinct kinds of operation:

1. Those which involve the death of the fœtus, such as craniotomy, cephalotripsy and embryotomy and their modifications.
2. Those which respect the life of the fœtus, *i. e.*, Porro's operation, one of necessity; and Säger's or modern Cæsarean section and laparo-elytrotomy, both operations of choice.

Ganzinetti believes that soon the first group of operations will be rejected when the infants are living, and for dead ones when the pelvis has more than a medium contraction 65 mm. ( $2\frac{1}{2}$  inches), because in extreme contraction laparotomy seems to involve less danger to the mother than craniotomy, etc. Formerly, when the mortality of Cæsarean section was from 36% to 60% it was held that this operation should not be performed without the mother's consent, offering her the choice between a greater risk to herself and the certain death of her child. Now, however, that the mortality of Cæsarean section has been reduced to 10%, or about the same as craniotomy, the question is one of choice between the two different methods of laparotomy, Säger's or laparo-elytrotomy. [For details of the former we are referred to *Annals of Gynecology*, March to June, 1886]. The latter operation is preferred for reasons stated later.

The object of this operation is to reach and open the upper parts of the vagina above the brim of the pelvis, by dividing the abdominal wall down to the peritoneum, and turning this aside until the vaginal wall is reached.

Although out of 14 recorded cases there are 9 deaths, 4 of these must be put down to mistakes in operating, and in the 5 others the patient was so feeble at the operation, after previous efforts at craniot-

omy, as to give any operation small chance of success. In the five successful cases the woman was in a good state at the time of the operation.

The conditions are a living and viable child, the mother's consent, isolated room, temperature  $64^{\circ}$ – $67^{\circ}$  F., and antiseptic precautions.

Four assistants are required, one for anæsthetics, one for instruments, one to help the operator, and a nurse to take charge of the infant.

*Instruments:* Bistouries, grooved directors, dissecting and pressure forceps, retractors, etc.

Bladder and rectum emptied, vagina washed out with 1–2,000 corrosive sublimate lotion, skin of groin and pubes shaved and washed.

1. Incise for 15 to 17 cm. ( $6$  to  $6\frac{3}{4}$  in.) parallel to Poupart's ligament and 1–2 cm. ( $\frac{3}{4}$  in.) above it, on either right or left side; divide abdominal wall layer by layer down to the fascia transversalis.

2. Raise peritoneum with the fingers from iliac fossa. This, owing to the effect of the enlarged uterus and to dilatation of the cervix, is easy.

3. Having by a sound in the vagina found where it and the cervix join, open as nearly as possible at that junction and not more than 2 cm. ( $\frac{3}{4}$  in.) below it, *i. e.*, above the ureter and uterine artery. Vaginal incision is enlarged transversely (Skene), longitudinally (Gaillard, Thomas), obliquely (Garrigues), or crucially (Poulet).

4. By vaginal wound introduce hand into the neck of the uterus and search for the feet to extract by turning, or if the head is already in the vagina to apply the forceps through the abdominal wound and extract.

5. Treat wound in ordinary way, drainage and antiseptics, but do not expect healing by first intention.

The advantages claimed for the operation are that neither the peritoneum nor the uterus are incised, that risk of pelvic cellulitis is no greater than in supra-pubic lithotomy, that fear of hæmorrhage is groundless when operator is methodical. Wound of the ureter is certainly avoided by incising the vagina above its level, and for a similar reason the uterine artery is still more secure.



On several occasions slight cuts in the bladder have formed temporary vesico-vaginal fistulæ. These, with one exception, have rapidly and spontaneously healed. In that one case a subsequent operation was performed for the fistula. All who have tried the operation on the dead and on the living testify that it is more rapid and requires fewer minutæ than Säger's.—*Le Bull. Med.*, June 1, 1887.

C. W. CATHCART (Edinburgh).

**VIII. A Successful Case of Cæsarean Section.** By WILLIAM T. LUSK, M.D., (New York). The subject was a primipara, æt. 24, suffering from lameness due to hip disease, which dated back to her eleventh year, at which time sinuses had formed in the neighborhood of the right acetabulum; these were cured, but during the latter part of pregnancy, new suppurating sinuses had appeared. The pelvic measurements were as follows :

	CTM.
Distance between the anterior spines - - - - -	21.5
Distance between the cristæ ilii - - - - -	24.
External conjugate - - - - -	16.
Distance between anterior and posterior spines (right side) - -	14.5
Distance between anterior and posterior spines (left side) - -	16.
Diagonal conjugate - - - - -	9.
Internal conjugate (estimated) - - - - -	7.5
Distance between the ischia - - - - -	6.5

While craniotomy was not absolutely impossible, the risk of extracting the child through the natural passages, owing to the combined transverse and antero-posterior narrowing, were considered to equal if not exceed Saenger's modified Cæsarean section; accordingly this operation was performed through an incision extending from a point 3 inches above the umbilicus to within 2 inches of the symphysis pubis. The uterus was then tilted with its left border to the front, and everted from the abdominal opening by firm downward pressure upon the abdominal walls. After the uterus had been turned out the intestines were retained by a large flat sponge placed behind the womb and beneath the abdominal walls. A piece of rubber tubing was placed around the lower segment to control hæmorrhage and the exposed uterus was wrapped in towels wrung out in a warm sublimate solution (1-5000) which were replaced at short intervals.

A short incision, about 2 inches in length, was first made in the median line near the lower uterine segment. The tissues were divided slowly and with care until the membranes were reached, then with the scissors the incision was rapidly extended upward toward the fundus until an opening 5 inches in length was obtained. As the uterus contracted, the membranes formed a hernial protrusion from the wound. The child was then rapidly removed and the separation of the membranes and placenta was accomplished by tractions upon the protruding sac and by means of two fingers inserted between the decidua and the uterine walls; the uterine cavity was carefully sponged with a 1:10,000 sublimate solution. The arrest of the circulation by means of the elastic ligature gave the uterus a pale waxy appearance and rendered the incision nearly bloodless. The wound was closed by sixteen deep and eighteen superficial Lembert sutures of carbolized silk. On the removal of the ligature, there was slight bleeding from one of the stitches, which could not be controlled. The abdominal wound, however, was then closed by ten silver sutures, a drainage tube having been inserted behind the uterus. The child weighed five and a half pounds and was deeply cyanosed at the moment of extraction, but was resuscitated. During convalescence, a large abscess formed at the hip and had it not been for the symptoms resulting from this hip complication, the period of convalescence would have compared favorably with that following an easy natural labor.—*N. Y. Med. Jour.*, May 7, 1887.

JAMES E. PILCHER (U. S. Army).

**IX. Extra-Uterine Pregnancy. Laparotomy. Cure.** By M. BRUCH (Algiers). He mentions two similar operations which he has lately performed, and remarks on the difficulties of diagnosis and the treatment of extra uterine pregnancy. He believes laparotomy to be the only operation that should be commended, and he condemns all intervention through the vagina. He insists on making a distinction between a free opening into the abdomen and an opening into pouches adherent to the abdominal walls, which behave like huge abscesses, two operations which are too often confounded. For extra uterine foetation Koeberlé and himself are the only two surgeons who

have practiced true laparotomy. He also mentions some peculiarities little known in the history of this malady, for example, the partial or total fusion of the foetus' skin and the cyst walls, an occurrence which would render all extraction per vaginam an illusion. To sum up, whenever a diagnosis can be made, he has no hesitation about operating and goes to work at once through the abdominal wall.—*Le Progrès Médical*, Dec. 18, 1886, P. 1098.

L. MARK (London).

## SYPHILIS.

I. The Subcutaneous Injection of Calomel in the Treatment of Syphilis. By KAPP and CHOLZEN. On the Elimination of Mercury by the Urine, Etc. LANDSBERG. Employing for the most part a 25% solution of chloride of sodium in which 10% of calomel was suspended, the former authors have treated over two hundred and fifty cases of syphilis with very good results. It might have been expected that sometimes the calomel would remain inert, but it is stated that this never occurred. As a result of the 1,523 injections administered an abscess resulted 72 times, *i. e.*, 4%; nevertheless it is claimed that the method is more convenient than that of mercurial inunction. Landsberg has carefully estimated the elimination of mercury from these patients as well as from some treated by the ordinary methods, and has arrived at some interesting results, which may be thus summarized: 1. Mercury can be detected in the urine within twenty-four hours from the first administration of moderate doses. 2. After a thorough mercurial course has been followed it can be detected in the urine from four to fourteen months after the cessation of administration. (In one case it was said to be detected two years and a half afterwards). 3. The form in which the drug was given appeared to have little or no effect with regard to the elimination by the kidneys, and if large doses were employed the only difference noted was that the mercury could be detected for a longer time than in the case of small ones.—*Vierteljahrsschrift f. Dermatologie und Syphilis*, 1886, P. 747. Inaugural dissertation, Breslau, 1886.

II. Hysterical (?) Paralysis in Syphilitic Subjects. By M.

POTAIN (Paris). A young woman contracted syphilis," and during the secondary stage suffered from profound nervous depression. Seven years later she became hemiplegic on the left side, the paralysis coming on in the course of a day and being preceded by severe pain in the left ear. There was anæsthesia, analgesia and loss of motor power on the affected side, and in addition the left facial muscles and external rectus were paralysed. In the absence of any evidence of vascular or cardiac disease M. Potain diagnosed the hysterical nature of the hemiplegia of the limbs, and this was confirmed by the great improvement under galvanism; at the same time he pointed out that the facial muscles were never affected in hysterical paralysis, and from the fact that the palate was affected he inferred that there was a gummatous lesion of the sixth and seventh nerves near their origin. The patient had at the time a node on one femur.

The second case was that of a man æt. 34 years, of neurotic tendencies and given to alcoholic excess. Ten years after contracting syphilis he suffered from intense headache and then followed several convulsive seizures during which he lost consciousness. This latter feature together with the facts that the movements were sometimes unilateral and that a comatose condition persisted for some time after the fits, pointed to epilepsy; but on the other hand some of the attacks were like hysterical ones, ending in a flood of tears, and a sort of cataleptic condition was observed at times. When admitted he also had loss of power and sensation in the limbs of the left side (the knee reflex being absent), achromatopsia, with loss of smell, taste and hearing on that side. It should be mentioned that the patient had been very imperfectly treated during his secondary stage and that he now had a node on the vertex of the skull. M. Potain regarded the case as one of hystero-epilepsy in which both syphilis and alcoholism had been factors of causation. Considerable improvement in all the symptoms followed treatment with iodide and mercury. The fact that the convulsions first appeared at the age of 34, would of course be strong evidence against true epilepsy, apart from the character of the fits.

The cases are interesting as showing the co-existence of so-called hysterical and epileptiform phenomena and tertiary lesions of the

meninges or vessels (?) of the brain, and as illustrating the extremely complex nature of some cases of cerebral syphilis.—*Gaz. des Hôp.*, April 28 and May 7, 1887.

J. HUTCHINSON JR., (London).

**III. Syphilis as an Etiological Factor in Disease, Especially in Connection with Pulmonary Lesions or Syphilitic Phthisis.** By WILLIAM HENRY PORTER, M.D., (New York). This is an admirably clear and satisfactory paper from which the following conclusions are drawn: (1) Etiology—Pulmonary lesions attributable to syphilis are very common, more so in females than in males, with the maximum number of cases occurring between 30 and 40 years of age; it is as frequently, if not more frequently, inherited than acquired. (2) Pathology—The lesion is most frequent at the apex and usually involves both lungs; it is a peculiar pneumonic process in the early stages, while later cavities are formed, and it becomes phthisical in the sense of progressive consolidation, followed by softening and the formation of cavities. There is a strong resemblance, but a positive difference, between syphilitic and tuberculous phthisis, and a positive anatomical difference between syphilitic and miliary tubercle. (3) Symptoms—These are peculiar and diagnostic. (4) This rests mainly upon the rational history and physical signs, the extreme dyspnoea, the periosteal tenderness, and the absence of an increased bodily temperature. (5) Prognosis—This rests upon an early recognition of the trouble. (6) Treatment—It must be antisyphilitic to be of any avail. Many cases are unaffected by iodide of potassium alone, unless under enormous doses, but a rapid improvement follows upon the use of biniodide of mercury, iodide of ammonium and iodide of potassium in combination. *N. Y. Med. Rec.*, March 12, 1887.

JAMES E. PILCHER (U. S. Army).

## REVIEWS OF BOOKS

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DIE TYPISCHEN OPERATIONEN UND IHRE UEBUNG AN DER LEICHE mit specieller Berücksichtigung der topographischen Anatomie, sowie der Bedürfnisse der praktischer und Feldarztes. Von Dr. EMIL ROTTER, Stabsarzt, etc., Munich: J. A. Finsterlin, 1887. (New York, G. E. Stechert).

THE TYPICAL SURGICAL OPERATIONS, AND THEIR PRACTICE ON THE CADAVER, with special regard to surgical anatomy, adapted to the wants of the general practitioner and military surgeon. By Dr. EMIL ROTTER.

The contents of this little book, of 235 pages small octavo, is fully described in the title.

It gives, in as concise a manner as is compatible with completeness, a description of the mode of performing each recognized typical surgical operation, prefaced by a detailed review of the topographical anatomy of the region in question, and followed by a description of the anatomical aspect of the wound after performance of the operation and before its closure with sutures. In addition to this a few casual remarks relating to indications and clinical and statistical data are frequently given in fine print, while the chief characteristic features of each operation, are premised in one or two lines immediately below the title of each operation. This arrangement at once marks the practical character of the book, and demonstrates the extended connection of the author with an operative course upon the cadaver.

In the introduction the writer pleads for the more extensive use of subjects, on which post-mortem examinations are performed by practising physicians, for the purpose of exercising surgical operations. He would have the opening of the thorax commenced with a typical tracheotomy, and typical surgical exsections of the joints performed on cadavers of patients dying of articular rheumatism.

Whatever may be thought of these propositions, they will at least indicate the point of view from which the book was written.

As to the material treated of, a judicious selection of operative methods has been made; two methods of exarticulation of the hip are given, both commencing with posterior incisions, while other methods are casually referred to in the notes. Ten methods of amputations and exarticulations touching the foot are given.



The book is well up to date in the matter of nerve and tendon-sutures, resections of the intestines, etc.

Several fair wood-cuts are inserted in the text illustrating anatomical or surgical statements.

W. W. VAN ARSDALE.

UEBER DIE PRINCIPIEN DES ZEITGEMAESSEN KRIEGSWUND VERBANDES.

Von Dr. C. LANGENBUCH, Sanitätsrath, etc. Berlin: Aug. Hirschwald, 1887. (New York, G. E. Stechert).

ON THE PRINCIPLES OF MILITARY SURGICAL DRESSINGS AT THE PRESENT TIME. By Dr. C. LANGENBUCH.

A pamphlet, 33 pages in length, containing propositions for the treatment of wounds in time of war founded upon the author's experience at Sofia during the recent Servian and Bulgarian war.

In accordance with other recent writers on the same subject, the author is in favor of the application of an antiseptic dry dressing, or at least of antiseptic tamponade, of all the wounds on the battle field itself immediately after or during action. These dressings should not again be interfered with unless indications arise. Operations, however, on the field should be restricted to primary life-saving ones, to constrictions after Esmarch, and to immobilizing limbs for transportation.

On the other hand, he would not have iodoform or dry dressings used if the wound proves infected, but generous absorbent dressings after free opening and draining of the wounds.

He recommends the use of starched gauze bandages with splints instead of plaster-of-Paris.

The most striking feature in the pamphlet is the admission to military surgical practice of the recent reaction against iodoform begun by scientific experiments.

W. W. VAN ARSDALE.

DIE CHIRURGISCHE BEHANDLUNG DES KROPFES. Von Dr. ANTON WÖLFLE, Professor der chirurgie zu Graz. Berlin, 1887: Aug. Hirschwald. (New York, G. E. Stechert).

THE SURGICAL TREATMENT OF GOITRE. By Dr. ANTON WÖLFLE, Professor of Surgery at Graz.

This genially-written book, of about 90 pages large octavo, contains a complete history of the surgical treatment of goitre from the earliest ages to 1886. There is not a name connected with a surgical operation upon goitre that is not mentioned or treated of at length, while a complete list of all publications on the subject may be found in the foot-notes on each page.

In this manner the author shows how the operation of extirpation of thyroid tumors was advanced and declined in different periods of surgical history, and this idea is illustrated by appropriate tables and a chart.

The author regards the present time as an epoch in the history of goitre and its treatment, when the antiseptic method has been fully mastered, and yet no longer embarrasses our critical judgment as to final results, and when our knowledge of complicating conditions after operations for goitre, such as the "cachexia strumipriva," has increased, although he fully realizes how much there still remains to be done, in order to answer the many vexed questions connected with his theme.

The work, compiled with an extraordinary amount of industry and familiarity with the subject is inscribed to Prof. Billroth, who, twenty-five years ago, was the first to attempt to remove goitres by operation, and who has since operated upon more than 230 cases.

W. W. VAN ARSDALE.

ANTISEPTIK UND TREPANATION. Von Dr. K. SEYDEL, Privat-docent, etc., an der Universität Munchen. Munich, 1886, Heinrich Muller. (New York, G. E. Stechert).

ANTISEPTIC PRACTICE AND TREPHINING. By Dr. K. SEYDEL.

This valuable book, 176 pages large octavo, is the outcome of the recent great advances in the surgery of the brain due to the exercise of the antiseptic method. The object of the author has evidently been to set forth the immense influence for good that antiseptics have had upon the operation of trephining, as well as to consider the present indications for interference in disorders and injuries of the brain.

The author begins with a very complete historical review of the operation of trephining from antiquity to the present time, including the period of development after the introduction of the antiseptic system into surgery. In succeeding chapters he treats of trephining for simple and for compound injuries to the skull, for retention of pus (Pott), for abscess of the brain, for cranial osteitis, for neoplasms, and for epilepsy, etc. In each of these chapters statistics are given a tabulated review of all the cases known to the author, which were operated upon with antiseptic precautions. By comparing the statistical figures gotten from these tables with the statistics of pre-antiseptic times collated by Bluhm, and with the statistics of cases treated by conservative methods, as given by Cramer and Weismann, the author is enabled to deduct not only that the operation of trephining is not at all dangerous when performed with antiseptic precautions, but that it is much more frequently indicated, than it is at present performed.

Very little is said as to technical details of the operation, most recent publications in Germany having treated sufficiently fully of this subject.

The work throughout bears evidence of the most careful study and research, and contains references to all the important works having appeared up to the time of its publication, excepting, however, the American articles appearing in the fall of 1885.

W. W. VAN ARSDALE.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. A work of reference for medical practitioners. Edited by PERCY WILDE, M.D. Bristol: John Wright & Co. London: Hamilton, Adams & Co. New York: George Putnam's Sons. 1887. Pp. 550, 8vo.

This work endeavors to provide a summary of the views expressed during the past year "by the leading European and American physicians and surgeons." The difficulties of such a task are of course very serious; but we are bound to say, after a careful examination of the book, that the editor and his eleven collaborators have performed their duties with great ability, and that the "Medical Annual" will be found exceedingly useful by anyone who possesses it. Four hundred and eighteen pages are devoted to "a dictionary of new treatment in medicine and surgery." This deals with its subjects in alphabetical order; and "hernia" may be noted as an example. Among the things noticed in this article are Dr. Wood's opinion on the etiology of hernia and his monograph on their radical cure; Dr. McEwen's new and original operation recently described in our own columns, Schmidt's paper, (*Arch f. klin. chirurg.*, 1885) on "Goyrand's" and "Kroenlein's" herniæ, Square's case of hernia into the foramen of Winslow, Chiene on irreducible and umbilical herniæ, Clement Lucas's paper on the latter, Dr. Walter Rivington's contribution to the *Lancet* of October 24, and several minor points.

Among other contents of the "Medical Annual" are a list of medical books of the year, a drug and dose index which gives the doses of newest and latest fashions in drugs, and a note-book with pages for "books and instruments lent." At the top of this is the following original advice: "When lending a book fix a date for its return, write this date after the name of the book and borrower below. If it is not returned at the proper time, make a copy of the entry on a post card and send it to the delinquent."

The work is well printed and conveniently bound.

C. B. KEETLEY.

# THE OSTEOGENIC FACTORS IN THE DEVELOPMENT AND REPAIR OF BONE.

By WILLIAM MACEWEN, M.D.,

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MUCH obscurity exists as to the distinctive role played by the various parts of bone in the development and repair of osseous tissue. Ever since Duhamel, the French naturalist, conceived in 1739, the idea that bone grew from the periosteum, it has been believed that that fibrous membrane produces bone, in the same manner, to use his own words, "as an exogenous stem, grows from the inner layer of the bark." Though histological advance has toned this idea, and though it is now differently formulated, yet a belief of somewhat similar import is still deeply rooted. Apart from its intrinsic merit, as viewed from a developmental standpoint, the determination of the true osteogenic agents, in repair and reproduction of bone is of the utmost practical importance.

It is here proposed to examine the relations which the periosteum bears to the bone, and the osteogenic part performed by the various structures in development and in repair.

The periosteum has been long regarded as the chief factor in the reproduction of bone: more recently the medulla has been stated to be capable of bone regeneration, while a very insignificant part has been assigned to the elements contained in the osseous framework. Observation and experimental inquiry prove that the periosteum is not the potent osteogenic factor which many believe it to be, on the other hand, they show, that the soft tissues enclosed in the osseous tissue, play the chief role in the development and reproduction of bone.

The periosteum is the medium through which the bone

receives a portion of its blood supply. While freely admitting the importance of maintaining the intimate relations of the bone with this vascular membrane, it is submitted that too much fear is expressed that death of bone must follow the partial or temporary elevation of the periosteum. When only a part of a bone is denuded of its periosteum, it is still supplied with blood from the interior; the nutrient arteries and the vessels from the surrounding periosteum, inosculating freely in the medulla and sending a sufficient blood supply to the surface, for the preservation of the life of the bone.

*Proposition A.—When the periosteum has been mechanically detached from an extensive area of an adult healthy bone and replaced after the lapse of some hours, union between the bone and the periosteum can take place without sloughing or observable augmentation ensuing.*

Obs. I.—An adult healthy man met with an accident, whereby a flap of the scalp including the periosteum, extending from above the right eyebrow to the upper part of the occiput, was raised from the skull, and laid over the right ear. An area of the bone, seven inches long, and from three to four inches broad, was thus denuded of its periosteum. The patient entered the hospital, two hours after the accident, the scalp and periosteum lying until then over the right ear, the periosteum being uppermost. The parts were cleansed, rendered aseptic, replaced, and firm union took place in less than a fortnight, without pus production; three months after the healing of the wound, the part was examined. There had been no shedding of bone, there was no observable osseous thickening, and a linear scar was the only remnant of the injury. Union between the bone and its periosteum was firm and complete, and the patient was in perfect health.

Obs. II.—A lad of 18 years was the recipient of a machinery accident, whereby the soft tissues including the periosteum from the upper two-thirds of the anterior portion of the tibia were peeled from the bone, and lay in a flap which was folded over the lower part of the leg. The bone as minutely scrutinized, was quite bare, and lay exposed for over four hours. The parts were rendered aseptic, accurately brought together, and union was found to be complete when the dressings were for the first time removed at the expiry of three weeks. Seven months after, he was examined, when the part was not only seen to be healed, but as far as could be determined, there was no increase in the thickness of the bone at the seat of injury.



Numerous parallel cases can be cited as occurring both on the bones of the extremities and on those of the skull. These show that wounds which have separated the periosteum from the bone, heal after being brought together, just in the same manner as wounds do, which have separated one soft part from another. Sloughs may form in either case from injury or from arrest of the blood supply.

*Proposition B.—The periosteum may be separated from the bone for a period of days by inflammatory products, after the withdrawal of which, reunion between the periosteum and the bone may take place without necrosis ensuing; showing that the temporary separation of the periosteum from the bone, even as a pathological result, is not necessarily attended by death of bone.*

Several cases demonstrating this fact have been observed. The following are the most striking:—

Obs. III.—A girl 15 years of age was admitted to the hospital, suffering from a subperiosteal abscess of the right femur of six days' duration. Commencing at the epiphyseal line, at the distal extremity of the femur, it involved at least the lower two-thirds of the shaft, the periosteum being completely elevated from the osseous cylinder, the finger passing freely round the bone, and the latter being bathed in pus, ten ounces of which were evacuated by a series of incisions, through which perfect drainage was maintained. At the end of three weeks the wounds made for the drainage of the part were cicatrized, with one exception, which became healed at the termination of the fifth week. The limb was completely restored. Six months after, on comparing the one limb with the other, there was no discernible thickening. The wounds had not reopened in the interval, and the patient possessed the full function of the limb.

Obs. IV.—Another instance occurred in a girl æt. 18 years, the subperiosteal abscess involving the femur from the great trochanter to the condylar epiphyseal line. The symptoms of the attack had been present for eight days, though at what precise period the inflammatory action had passed into suppuration was not ascertained. The whole of the anterior part of the shaft was denuded of periosteum, behind, near the situation of the femoral nutrient vessel, there were some adhesions of the periosteum to the bone. The constitutional symptoms were marked. Free linear incisions were made into the



limb at various places, so as to prevent the possibility of pus reaccumulating under the periosteum. Complete recovery was effected. Two months subsequently, there was a thickening of the femur peripherally, especially at its lower extremity. There was no necrosis. The limb was restored to complete use. One year afterwards, the patient was examined. The peripheral increase had not augmented. It was found on measurement to be the same as it was when she left the hospital ten months previously. She walked to and from her work daily, a couple of miles, and only experienced fatigue and a sense of weight in the limb, when she over-exerted herself.

OBS. 5.—A delicate girl, *æt.* 12 years, was seen with acute periostitis of the tibia of four days standing. The constitutional symptoms were not so marked as in the other case, but the pain was excruciating. There was slight swelling of the tissues in front of the tibia. A couple of free longitudinal incisions were at once made down to the bone, giving vent to several ounces of slightly turbid serum. The periosteum was found to have been stripped from the bone, the bent probe passing freely round its circumference over the lower two-thirds of the shaft. The constitutional symptoms disappeared within twenty-four hours. The first dressing was removed at the end of a fortnight, when the wound was found healed. One year after she was examined, and at several subsequent periods. The limb was in no way increased in diameter; she had perfect use of it, and she stated that she had no pain or ache since she left the hospital.

No one will understand that cases of this kind always end so well. These are merely described as what occurred on those occasions, and illustrating the points at present at issue.

In observations three and four, the fact that the periosteum was stripped from the bone, over the areas indicated, was demonstrated by the probe, the finger, and in part by the eye itself. In these cases the nutrition of the bone must have been maintained through the medulla by means of the nutrient vessels. It proves that the separation of the periosteum from the bone for some days does not necessarily result in necrosis. In observations three and four, there was probably a considerable dilatation of the Haversian canals, interstitial absorption taking place as a preliminary result with a subsequent redeposition of new bone.

*Proposition C.—The periosteum covering a portion of bone may be completely destroyed or permanently removed, yet the denuded bone may not only retain its vitality, but may throw out cells which will cover it and form a new periosteum.*

Instances of this kind are very numerous.

Obs. VI.—A young adult man received an injury to his left lower limb, whereby the whole of the soft tissues were removed from a portion of the inner and anterior aspects of the tibia, and the bone was scraped and furrowed. The osseous area thus laid bare was three inches in length by about two in breadth. The elevated flap of the soft parts, including the periosteum, was so crushed that it died, leaving the bare bone exposed. Three days after the injury the surface of the bone presented a highly vascular appearance, and by aid of a hand glass numerous small points of granulations were discerned scattered over its surface. On the fifth day these islands of granulation tissue were greatly enlarged, on the seventh many of them had coalesced, and by the tenth day they had united in great part with the granulation tissue at the periphery of the wound. On the fifteenth day the bone was completely covered by a uniform layer of granulation tissue which at the end of six weeks had become completely covered by epidermis.

In this instance the vitality of the bone was evident from the outset, and the granulations sprouted from the osseous surface by way of the Haversian canals, and filled up the furrows which had been dug in the bone by the injury. It was remarked that the deepest trenches were those which were soonest filled with granulation tissue, and several small areas where the cortical layer had remained intact, were last to become covered with granulations. That is to say, the parts which had previously been in immediate contact with the periosteum showed a vitality much less active than the deeper portions of bone. Structural differences account for this, the most superficial part of the cortical layer of an adult healthy bone, being more dense and less vascular than the deeper portions.

The same phenomena are not unfrequently seen in compound fractures, where the extremities of the bones have been subjected to direct violence, but probably it could not be better exemplified than in the following instances :

OBS. VII.—A man, æt. 35 years, had his arm at its upper third crushed between two revolving pinion wheels. Four longitudinal gashes, each exposing the bone, were inflicted on the soft parts equidistant from each other, each measuring four inches in length by one inch in breadth. The tissues of the whole circumference of the arm at its upper third were much bruised, the muscles reduced to pulp, the vessels and nerves lying exposed and separated from one another, while the upper third of the humerus had sustained a comminuted fracture. The proximal extremity of the lower portion of the shaft lay exposed, being visible through each of the four wounds. Not only was it denuded of its periosteum, but for two and a half inches the whole circumference of the osseous cylinder had been subjected to a force which had crushed off the entire cortical dense portion, leaving a porous osseous frame work, enclosing cancellated tissue. It was evident from the state of the bruised and lacerated strips of soft parts which partially surrounded the bone, that little sustenance could be derived from them for the support of this portion of the bone. Therefore, if this portion of bone were to live, it would require to depend upon its own vitality, obtaining its blood supply from the lower part of the shaft. Much sloughing of the whole of the soft parts ensued, round the entire circumference of the upper third of the limb, with the exception of a thin strip, about half an inch in breadth, surrounding and including the brachial vessels and nerves: so that with this exception the continuity of the entire thickness of the soft parts from the skin to the bone was severed over an area of three to four inches in longitudinal diameter. A single stroke with a pair of dressing scissors would have sufficed to complete the severance of the limb. The proximal two and a half inches of the humeral shaft deprived of its cortical layer and destitute not only of its periosteum, but all of its soft covering lay free on all sides.

It was with difficulty that this portion could be fixed to the upper fragment, which likewise at its extremity was denuded of soft tissues including the periosteum; as wire sutures cut through the softened cancellated tissue whenever strain was placed upon them. The bones had therefore to be held in position by means of chromicized catgut, applied in a series of circles surrounding the fractured extremities, as is done in splicing. This catgut intervened between the strip of tissue containing the vessels and nerves and the bone: but the individual whorls of the catgut were placed at such intervals as to allow of the bone being observed.

The parts were subjected to a daily scrutiny, and as the bone lay thus exposed the various changes were easily ascertained.

This exposed portion of bone never lost its vitality, retaining from the outset its life-like hue. By the fifth day it showed increased vascularity; by the tenth numerous granulation buds were seen sprouting from the interior of the bone, and they increased so rapidly that they soon covered its entire surface and mounted round the strands of catgut. Subsequently, the granulations which had formed round the vicinity of the main vessels, became united with those proceeding from the bone, and at a somewhat later period the latter united with the granulations from the proximal and distal aspects of the hiatus in the soft parts, which had been left by the sloughs. Once this was accomplished, cicatrization went rapidly on, though twelve weeks elapsed before it was complete. The fracture united firmly. There was no osseous necrosis, but there was a perceptible augmentation in the circumference of the shaft at the seat of the injury. The cicatrix firmly adhered to the bone, and though the shaft is continuous, there is still a gap of several inches existing between the muscular bundles which have become attached to the shaft; the upper portion of them above, and the lower parts below the seat of fracture.

A very interesting point in connection with this case, is the power which the patient now possesses over this arm. It was believed that the forearm alone would be of service to him, but he can raise his arm above the shoulder, though he has more power below that level; and he states that a year subsequent to his dismissal from the hospital he was engaged as a stoker, throwing into a furnace 40 tons of coal per week. The particular mechanism in this deranged muscular apparatus relatively to its osseous lever will afterwards be referred to.

This case therefore illustrates the fact that two and a half inches of the shaft of a long bone, bereft of its outer dense cortical layer, along with its periosteum, and freed for some days from all contact with living soft tissues, except a narrow strip surrounding the main vessels and nerves, cannot only retain its vitality, but throw out sufficient ossific material to enable the fractured extremities to unite firmly together and to add to its circumferential thickness, to restore its density, and to clothe itself with a new fibrous tissue layer or periosteum. The whole of its nutrition must have been supplied for a considerable period entirely from the interior of the shaft.

Obs. VIII.—A boy, æt.  $3\frac{1}{2}$  years, had the periosteum stripped from the whole tibial diaphysis of one limb, with the exception of a small

portion posteriorly, which surrounded the nutrient vessel. This was the result of acute suppurative periostitis, the symptoms of which had lasted for nearly seven days, previous to his admission under observation. The local appearances and the constitutional symptoms were marked. Several linear incisions were made exposing the whole length of the tibial diaphysis. The shaft was quite bare, the periosteum having been separated from it by an accumulation of pus. This had formed round its whole circumference extending from the one epiphysis to the other, with the exception of a patch posteriorly, surrounding the nutrient vessel. Owing to the distention of the periosteal sheath by pus it had become stretched so as to permit the finger to pass round the entire circumference of the shaft. When the parts had been thoroughly washed with a carbolized solution, the bone appeared like a piece of white porcelain.

Between the periosteum and the bone there was placed a series of layers of sublimated gauze. This was so arranged as to separate the periosteum from the bone round its whole circumference, and over the entire length of the shaft, with the exception of part posteriorly, which surrounded the nutrient vessels.

Forty-eight hours afterwards the stuffing was removed, and the parts washed and inspected. The bone thus separated from its periosteum had all along its shaft the aspect of life, with the exception of a small portion which was doubtful. The stuffing was re-applied as before. On the fifth day the stuffing was removed from between the periosteum and the bone, when the shaft presented a pinkish blush, with the exception of a portion toward the upper extremity of the tibia which measured three-quarters of an inch in length by half an inch in breadth. This small part remained white and evidently dead. In many places on the shaft granulations were beginning to appear. The stuffing was again re-applied.

On the sixteenth day, after the operation, the whole shaft of the tibia was seen to be covered by granulation tissue with the exception of the small portion previously spoken of, which lay as a white island in the midst of a red sea. The periosteum was also covered by a layer of granulation tissue which was quite soft and pliable. There was no hardness indicative of bone formation detectible in this layer. The stuffing was renewed.

At the end of the fourth week it was found that the granulation tissue covered the entire shaft hiding it completely from view, and the small portion of bone which had been previously noted as bare was now easily detached. It was a scale about an eighth of an inch in thickness, its extremities and under surface showing traces of erosion



while the external surface was smooth and white. The granulation tissue covering the bone had a firm cartilaginous feeling, and though of some thickness could be moved latterly with difficulty, and felt firmly fixed to the shaft. It was only the most superficial portion of it which was soft and pulpy. In marked contrast to this was the granulation tissue covering the under surface of the periosteum which could be easily compressed by the finger and thumb. The two layers of granulation tissue were now for the first time permitted to come together and they soon coalesced. The wounds rapidly cicatrized, and there was a slight peripheral augmentation.

His constitutional state improved from the fourth day, when his temperature had fallen to normal, and the albumen disappeared from his urine.

This case shows first that there is a sufficient amount of blood furnished to the bone, to sustain it for weeks, independent of its periosteal supply.

In this case it received its supply through the nutrient vessels at the upper portion of the tibial shaft. Had these nutrient vessels also been occluded necrosis of the entire shaft would probably have ensued.

Second, it shows that though the periosteum be separated from the entire circumference of the greater portion of the shaft of a long bone, death of that bone does not necessarily ensue. The fact that in this case a small scale like portion of the external table of the shaft did die, and was so rapidly shed by the living osseous tissue, was proof of the activity of the vital action of the bone itself. Thirdly, that the periosteum which was kept separate from the bone did throw out granulation tissue, but it was soft and supple and showed no evidence of bone growth at the termination of the thirty-first day. Fourthly, whereas, at the same time the mass of granulation tissue thrown out from the bone itself felt firm and almost cartilaginous, and that the ultimate osseous thickening round the tibia corresponded to the amount thrown out by the bone itself. Fifthly, this case raises the question whether all, or at least many of these cases of acute periostitis, do not in reality heal from the bone tissue itself, even where there is ensuing thickness of the osseous periphery. This has generally been



attributed to the periosteal growth. This again would depend upon the preservation of the nutrient vessels.

*Proposition D.—A portion of bone which has its continuity severed on all sides, and at the same time has had all its periosteum removed is capable, of living and growing.*

Observations in support of this statement are very numerous. The following may suffice to establish the fact :

OBS. IX.—A man in good health, æt. 40 years, received a compound comminuted fracture of the right tibia about its middle third. A portion of the inner and posterior aspect of the tibia was completely detached, and lay obliquely between the upper and lower fragments. It measured an inch and a half long, an inch broad in the centre, and three-quarters of an inch in thickness. It was entirely destitute of periosteum. It was removed, washed in carbolyzed solution and replaced in its proper position. For ten days the whole of its inner surface lay exposed in the wound, its surface presenting a whitish appearance with minute red spots. At the termination of this period a pinkish blush suffused the whole surface of the fragment. In looking at this through a hand glass it was seen to be composed of minute blood vessels ramifying through the cortical layer, and presenting themselves in leashes at the orifices of the Haversian canals. Soon granulation tissue was apparent to the naked eye forming innumerable islands over the surface and finally coalescing. There was no necrosis. The wound soon cicatrized and healed firmly. At the end of eight weeks perfect osseous union had taken place.

OBS. X.—A healthy man, æt. 36 years, suffered from a depressed comminuted fracture of the frontal bone of the skull, received from the kick of a horse. The depressed area was about two inches in diameter. The frontal sinuses were opened, and both internal and external tables of the skull were found to be crushed on to the dura mater, and the longitudinal sinus was penetrated.

A portion of the external table about two inches long and half an inch broad, was removed ; then six fragments of the internal table, each measuring, roughly speaking, one-quarter by one-eighth of an inch, were taken away, and lastly, a portion measuring one inch by three quarters, forming part of the vitreous table of the frontal fossa of the base, which had been loose and dislocated was likewise removed. All of these portions were destitute of periosteum. They were taken out,

cleansed, closely inspected, placed in an antiseptic solution and kept there until required. Fifteen minutes elapsed during which the wound was otherwise attended to, the bones were afterwards reimplanted, slight apertures being left for drainage. The wound healed under one dressing, and five weeks afterwards the reimplanted bones were found to be quite firm, a solid barrier having been formed instead of the large pulsating gap, (P. G. Ward 29, 1884) which otherwise would have been left.

Obs. XI.—A weak, ill fed boy, æt. 9 years, was admitted into ward 29 in January, 1884, suffering from a compound comminuted fracture of the skull with penetration of the brain substance, received about two hours previously by the fall of debris from a chimney. The brain symptoms are not referred to here.

There was a wound situated over the left side of the head of a somewhat crescentic shape and extending from above the middle of the left eyebrow, to an inch behind the auriculo-bregmatic line. The scalp was torn into several pieces, some of which lay over the ear. All of them were much bruised and lacerated. The skull was found shattered from an inch above the middle of the left eyebrow to a point half an inch behind the auriculo-bregmatic line. The depressed portion was somewhat elliptical, with very irregular margins. It measured at its broadest part two and a half inches. All of these portions of bone were depressed below the level of the skull, most of them having penetrated the brain membranes into the brain tissue. Those portions of bone were all elevated. It was found that they consisted of eleven pieces, the periosteum having been scraped from all of these with the exception of the most posterior one, which was only partially denuded. Many of them were infiltrated with lime debris, brick dust, etc.

These pieces, as they were elevated, were placed in an aseptic atmosphere. They were then pared with a chisel in order to remove the debris. This was especially necessary over the external surface where they had been scraped and ingrained with dirt. They were afterwards thoroughly washed in an aseptic solution, divided into fragments and replaced. In this way a mosaic work of fourteen pieces of bone was formed. It was difficult to retain these in position owing to four things. First, to the extent of the osseous defect; second, to the fact that the dura mater had been so extensively lacerated and torn that it formed a very irregular floor to rest the fragments upon; third, to the great bruising and crushing of the scalp, which rendered it difficult to bring the several pieces into apposition, and made sloughing of a part of it almost certain; and fourthly, to the

force of the cerebral impulses which caused a distinct movement of the fragments, producing crepitation by the one rubbing against the other. It was feared that owing to these four circumstances some of the fragments would be shed. It is to be borne in mind, that the periosteum had been by the injury entirely removed from all these fragments except the most posterior one; and that most of them had to have their external surface pared with a chisel. The soft tissues were brought together as well as possible and the wound was dressed.

On the sixth day after the operation the wound was examined. A portion of the anterior aspect of the flap which was lacerated and contused had sloughed, and already the process of separation from the living part had commenced. On the tenth day the wound was re-examined, and this portion of the slough was removed. It was then seen that four fragments of bone were exposed, two of which lay side by side, and presented a striking contrast. The one was suffused with the pinkish blush of life, the other with the pallor of death. The conditions of the remaining exposed fragments was doubtful, one of them, however, being very pale. On the twenty-first day at the next dressing, two pieces of bone were found to have shed, while all the remainder had lived, the wound was all but healed. At the termination of a month it was firm.

OBS. XII.—A fairly healthy man (J. B.), æt. 26 years, was admitted to ward 29 in 1885, suffering from a compound comminuted fracture of the lower third of the left tibia and fibula received by a blow from a screw propeller of a steam ship. There were two large wounds freely communicating with one another. The one was situated anteriorly, and the other posteriorly, and each measured about two and a half inches by one inch in diameter. The bones were so shattered that one could see through the leg from one wound to the other. The bones were divided into numerous fragments, measuring about quarter of an inch to an inch in length, and of very variable diameter, all completely detached from one another and many of them destitute of periosteum. Besides there were two portions of the tibia, each about two inches in length, by about an inch in breadth, which lay detached and buried in the muscles. Several of these pieces had to be lifted out, one of them measured an inch and a quarter in length by an inch in breadth. It had no periosteal covering and consisted chiefly of the dense tissue of the bone. There were thus about three inches of the length of the shaft of the tibia, which had its circumference broken into fragments, which were strewn among the lacerated and chopped up muscles and periosteum. There were many long shreds of periosteum which lay twisted and acutely bent over the proximal fragment.

and also a few over the distal portion of the shaft. These had to be elevated and detached, as they were infiltrated with dirt. All these portions of bone were picked from amongst the bruised muscles, they were then carefully cleansed, washed in antiseptic solution, and re-adjusted into the form of the shaft, the muscles having been drawn together posteriorly, in order to form a floor upon which the various osseous fragments might rest, many of the pieces having to be held together by strands of catgut. Six weeks subsequently, when the limb was examined for the first time, the larger wounds were found to be practically healed, some granulation tissue covering a small portion. Ten weeks subsequently, when the wound was looked at for the second time, the wounds were seen to be firmly healed, the bone was not quite firm. At the end of fourteen weeks it was found to be completely consolidated.

Eighteen months afterwards, patient revisited the wards to report himself. He was then able to walk twelve miles without fatigue. There never had been any break in the skin since his dismissal, and there was only a little thickening at the seat of injury.

*Proposition E.—Not only do detached portions of bone deprived of their periosteum live when reimplanted in their original position, but such portions are capable of living after transplantation. Parts of deeper layers of bone which had no periosteal connection have been transplanted and have lived and grown.*

OBS. XIII.—The subject of this observation was a patient in ward 22, Royal Infirmary, in 1878, and the facts concerning him have been published in a communication made to the Royal Society, London, in 1881, and to the Academy of Science, Paris, in the same year. The reader is referred to the proceedings of the former body for further details, as a résumé of the points bearing on the present subject are alone alluded to here.

This boy, æt. 2 years, lost the shaft of his right humerus from suppurative periostitis, ending in complete necrosis of the humeral diaphysis. The necrosed bone was removed about nine weeks after the onset of the periostitis, leaving the layer of granulation covering the periosteum intact and forming a tube which was kept patent by dressings suitably inserted until the whole space had granulated up. No bone grew from the periosteum, except a small part next the proximal epiphysis, where at the outset the periosteum was found covered by plaques of adherent osseous tissue. From the whole extent of the

remainder there was no osseous deposition, the result being a flail like arm. Fifteen months subsequently he returned to the infirmary, his parents desiring that the arm should be removed, it being worse than useless, inasmuch as he required the other hand and arm to look after the flail-like one which was constantly dangling in the road. The condition of the arm was as follows: The bone had not increased in length since he left the hospital. When the limb was allowed to hang by the side, the measurement from the tip of the acromion process to the distal extremity of the humeral shaft was nearly two inches. In form, the proximal fragment was conical tapering from the rounded head to a narrow spike-like extremity. From this to the condyles there was a complete absence of bone, there being nothing but soft tissues in the gap. The muscular power was good, but when he attempted to raise his arm a contraction of the muscles took place, the condyles being drawn toward the proximal extremity, while some fibres of the deltoid raised the spike like process of the upper portion, causing it to project, as if about to penetrate the skin. Here the action ceased, the soft parts in the gap appearing like a rope during the muscular contraction. He could not raise his forearm to his breast. If one caught his arm firmly with the hand placed over the gap, so as to keep the condyles fixed, and separate from the upper fragments, then the patient could elevate his forearm toward the chin. The power was there, the lever and fulcrum were wanting. It was determined to supply these by transplantation from other human bones. In the wards there were numerous cases of marked anterior tibial curves, from which wedges of bone had to be removed, and these were utilised as transplants. An incision was made into the upper third of the humerus exposing the head of the bone. Its extremity for fully a quarter of an inch was found to be cartilaginous. The cartilaginous spike-like process was removed, leaving there a portion of bone which measured one inch and three-quarters from the tip of the acromion process. From this point a sulcus about two inches in length was made in a downward direction between the muscles. The former presence of bone was no where indicated, and there was no vestige of periosteum, and the sole guide as to the correct position into which the transplant was placed was an anatomical one. Two wedges of bone were then removed from the tibia of a patient *æt.* 6 years, affected with anterior curves. The base of these osseous wedges consisted of the anterior portion of the tibia, along with its periosteum, the wedges gradually tapering toward the posterior portion of the tibiæ. After removal they were cut into minute fragments with the chisel, quite irrespective of the periosteum. The bulk of the frag-



ments had no periosteum adhering to them, they having been taken from the interior of the bone. They were then deposited into the muscular sulcus in the boy's arm, and the tissues drawn over them, and carefully adjusted. The wound healed without pus production. Two months after a portion of bone an inch in length and three-quarters of an inch in thickness, was found firmly attached to the upper fragment of the humerus. In removing the finger from the head of the bone toward the graft, the latter could be easily distinguished by the sudden increase in the breadth. Now instead of the former sharp spike, the upper fragment ended in an obtuse terminal.

Two other wedges of bone of larger size than the first were similarly dealt with and inserted, two months subsequently to the first graft, and a third couple were placed in position five months after the first. These filled up the gap in the arm to the extent of four and a quarter inches, the arm then measured six inches in length. Soon the utility of the arm was greatly restored.

Seven years afterwards he was seen and examined. The shaft of the humerus was found to have increased in length by one and three-quarter inches, being now seven and three-quarters, and it had increased in circumference to a marked extent and had assumed a somewhat irregular shape. The length of the sound arm had, however, considerably outstripped the length of the transplanted humerus. The patient could use the arm for a great many purposes, taking his food, adjusting his clothes, and in many games.

What conclusions may be drawn from the data supplied by these experiments? Some have asked whether it was not possible that old periosteum remained in the arm and produced new bone, the operation of transplantation having acted as a stimulant to it. Had periosteum existed between the condyles and the upper part of the humerus, and if periosteum possessed an osteogenic power it had ample time to reveal itself by osseous growth during the fifteen months which had elapsed between the removal of the dead bone and the transplantation of the new. Again, in opening the sulcus between the muscles for the reception of the transplants, neither periosteum nor any like fibrous membrane was seen, so much so, that it was only by recognizing the relative positions which the muscles ought to occupy toward the humerus that a guide to the correct position of the transplants was gained. Further the growth of



bone in the arm was at first only commensurate with the insertion of the transplants. There was no indication of the osseous growth in the vicinity of the transplants which might have arisen from the supposed stimulated periosteum. Finally, the solid humerus still retains the irregularities of shape which the transplants were permitted to assume in the tissues. So that there is not an iota of fact to support the supposition that the new bone grew from old periosteum. The whole of the grafted portions, united to one another, and to the extremities of the epiphysis, by means of osseous increments, forming a solid rod, four and a half inches in length. Before these transplanted portions of bone could have united, there must have been a proliferation of the bone forming elements contained in the grafts. Had they united by fibrous tissue union, the arm would still remain mobile; but the union was solid. When the condyles were rotated the head of the humerus moved with it. In further illustration of the vitality of the transplants and the growth of the new bone from them, there is firstly, the evidence derivable from the callus thrown out between the second and third transplants, after their extremities were refreshed, the same phenomena being observed here as in an ordinary case of ununited fracture. The portions removed from the extremities, on refreshing the bones, were seen when submitted to microscopic examination to present all the aspects of growing bone. Secondly, the bone became sensibly thicker at the points where they were drilled for the reception of pegs. All these are evidence of the actual growth of bone from the transplants. Besides, the whole bone has now decidedly grown in length and thickness, the latter being at least due to the growth of the graft. When the extremities of the second and third transplants were refreshed, the appearances of both bones were that of living osseous tissue, surrounded by a thin vascular membrane, which bled when it was scraped up, much in the same way as periosteum would under similar circumstances. This membrane did not resemble the thick, semi-vascular capsule, which is found surrounding dead tissue in process of being absorbed. It was in fact a new periosteum.

*Remarks.*—In this instance it is probable that at the outset

of the disease, the nutrient artery of the humerus had been occluded or separated in the intensity of the suppurating process. The shaft deprived of all nutriment, not only from the periosteal vessels, but also from the nutrient ones, died *en masse*. The periosteum remained intact. Adherent to its upper margin were a few osseous plaques, which had been detached from the bone, these being in immediate contact with the epiphysis. These plaques grew in the form of a spindle-shaped rod, which formed the spike-like cartilaginous extremity of the proximal fragment. All the rest of the periosteal sheath which remained produced no bone, and showed no sign of its existence fifteen months afterward. It became completely absorbed. The arm had been kept fixed, all movement being prevented, the periosteal sheath was kept separate till it filled up with granulations. It had every opportunity of producing bone, but it did not do so, and instead it became absorbed.

It must be borne in mind that the resection of the necrosed bone was not undertaken at once. About seven weeks were permitted to elapse between the death of the bone and the removal of it. It was left thus long in the hope that the time allowed would have been taken advantage of by the periosteum in throwing out plaques of bone. This, however, it could not do, the death of the shaft having been sudden and absolute, not permitting an escape of osteoblasts into the periosteum.

Cases of subperiosteal resection of the humerus have elsewhere occurred in which the bone has not been reproduced. Nedopil performed a subperiosteal resection of the humerus in a boy 12 years of age, the shaft not being reproduced. Neudorfer also mentions a case in which the humeral shaft was not reproduced after subperiosteal resection. (Professor D. Vogt, *Die Chirurgischen Krankheiten der Obern Extremitäten*, p. 225, paragraph 212). In all such cases it is probable that the nutrient vessels have been occluded or blocked. If so the whole blood supply, that from the periosteum as well as from the nutrient vessels, would be cut off from the bone, and necrosis would be inevitable, so that a great deal depends upon the safety of the nutrient vessels which in cases of periostitis

is often the determining factor in the question of life or death of the shaft.

Obs. XIV.—An interesting fact was observed when a minute portion of bone was broken off from the deeper layer of new osseous growth, which consequently was far removed from any periosteal connection, and which was found to be capable of growing in the midst of granulations.

After removing a fibular central sequestrum, a hollow cylinder of new osseous tissue was left. On introducing a piece of specially prepared sponge into the interior of the osseous cavity, a spiculum attached to the internal surface of the osseous cylinder was detached and carried further into the interior of the osseous cavity, where it remained entangled in the meshes of the sponge. At the end of eleven weeks, when for certain reasons the sponge was removed, it was found partially filled with granulations and young connective tissue in the midst of which the spicule of bone was seen and attached to and surrounding its conical points there was a rounded knob of cartilage. The spicule measured three-sixteenths in length and the cartilaginous knob was almost one-eighth in its greatest diameter. When this tissue was decalcified it was submitted to microscopical examination. The cartilaginous nodule was intimately connected with and springing from the osseous spicula. It consisted of ossifying cartilage. At the further extremity of the spicula, where there was no cartilage, there was a portion of the bone which showed a few lacunar defects filled with leucocytes. A portion of the bone therefore nearest the periphery, and therefore perhaps subject to friction, occasioned by the arterial pulsations intensified in a confined space, was undergoing absorption, while its opposite and most central extremity was throwing out ossifying cartilage. This growth of bone took place under adverse circumstances at a distance from immediate contact with bone, subject to continual pulsating movements, and in the midst of a sponge filled with granulation tissue, a portion of which had suppurated. There was here no possibility of periosteal connection; there was no bone marrow, as the central sequestrum had just been removed, and the whole cavity was thoroughly washed with a free stream of watery solution of carbolic acid.

[TO BE CONTINUED].

ANEURISMS TREATED BY THE INTRODUCTION  
OF CATGUT, OR OF WIRE, WITH  
ELECTRICITY.<sup>1</sup>

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THE domain of cases upon which the surgeon may operate, owing to newly adopted principles, is enlarging year by year, and just in that proportion the number of "hopeless" cases diminishes. The most superficial observer will see a growing disposition to interfere with many varieties of infirmities for which in the past active treatment has been discouraged by all surgical authorities. One is led from time to time to review such maladies, and to ask whether advanced methods will yet allow us to touch them. As the miner has often found a fortune in the discarded ores of silver mines when worked over by a new process, so now some of the forbidden cases of twenty years ago are fairly met by justifiable new procedures.

In this spirit of inquiry I venture to open the question of the value of interference with a small class of aneurisms, the treatment of which has heretofore been considered useless. This class is that of aneurisms springing from the aorta or its greater branches, and not amenable to the ligature or relieved by medicine, diet or rest. These are so common that we all see them from time to time. They run a steady downward course, interrupted, happily, in some cases by a temporary clotting, but soon advancing again, leaping the barriers of bone and cartilage until the thinned walls give fatal pressure-effects on veins, nerves, or the trachea, or sudden rupture ends the patient's misery.

Taking for our guide nature's attempt at repair by the two methods of deposition of firm clot, or by thickening the sac

<sup>1</sup>Read before the New York Surgical Society, March 23, 1887.

through hypertrophic, or inflammatory changes, we find the most promising to be that of inducing clot within the sac.

Practically, accumulated experience shows that coagulation *will* take place upon certain foreign substances introduced into the current. Wire is especially favorable, either silver, iron or steel. This can be sterilized by preliminary boiling in carbolic solution. Thirteen cases of the use of wire have now been reported, to which I am able to add two more. The first attempt was made by Mr. C. H. Moore, of Middlesex Hospital, in 1864, of which I will speak later. Moore's method consists merely in the introduction of wire. Of the cases now on record, the most brilliant results were obtained last year by Loreta, of Bologna, and Morse, of San Francisco. The outcome of the others has not been curative, though seeming to look in the right direction.

Last year Mr. Richard Barwell practiced a modification of Moore's method, by introducing ten feet of steel wire into an aneurismal sac and passing a current of electricity through it, strong enough to obtain an electrolytic action and to induce the formation of a coagulum by quick deposit. Thus, he substituted a long wire, coiled in the blood current, for the short needle-point of so-called electro-puncture, which latter alone has in many hands been of unquestionable service in ameliorating the condition of aneurisms in the last stage.

Mr. Barwell's patient was a man with large aneurisms of the aortic arch, apparently a hopeless case, and associated with serious lung trouble. A fine, insulated trocar served to allow the steel wire to pass. The positive pole was attached to this while a negative pole of spongiopiline was spread over the back. A current of ten milliampères was passed for an hour and ten minutes. The man had no pain or inconvenience. The tumor gave no sign of immediate improvement, but in twelve hours "the man appeared much better, the tumor was more solid, and the pulsation more distant." Four days later a tumor appeared at the other side of the neck, which had been observed two years before, and then disappeared—evidently an extension of the sac in that direction. One week later he died of his pulmonary trouble. A post-mortem was obtained, and of the clot that was found in the aneurism he



says: "The wide coils of wire are surrounded by thick, firm, colorless clot, which in many places binds the wire to the sac-walls, thus strengthening them and rendering rupture hardly possible where the wire had penetrated. In the secondary sac this had not formed." Barwell commends the method for large internal aneurisms.

Soon after the publication of Barwell's case, Dr. J. West Roosevelt, of this city, had an opportunity to try the method on a case of aggravated aortic aneurism threatening death.

He has kindly offered me the case to report in this connection.

The patient was a man, æt. 25 years, with a syphilitic history. In November, 1885, he began to notice a dry cough; some weeks later dyspnœa and dysphagia ensued, and pain was present in the right pectoral region and axilla, occasionally extending down to the right arm, or into the back near the scapula. At that time also he noticed a pulsating tumor in front of the chest at the right of the sternum. His dyspnœa was great when he lay on the left side or back. He had been prevented from working for four months, yet he was in fair flesh. The pulsating tumor involved the four upper ribs near the sternum and gave a double bruit. He was given iodide of potash, was kept at rest, and somewhat under the influence of anodynes for two weeks with slight ease from pain, but the tumor continued to enlarge.

On August 4th, Dr. Roosevelt placed the man on his back, and inserted a short, insulated aspirator-needle into the tumor; when the blood trickled out he passed about seventy-five yards of fine steel piano-wire (No. 00). The patient experienced some feeling of weakness, became pale, and had pain, from the position on the back, to which he was unaccustomed. The wire was connected with one pole of a constant battery, and a large wet reophore was placed under the right shoulder. From four to eight cells of an ordinary galvanic battery were used, measuring 25 milliampères. It gave him no pain, and was continued for a half hour. The tumor still pulsated. He was kept quiet another half hour and then was put to bed. He had no pain subsequently from the operation. On the following night he required morphia for insomnia.



Next day the tumor did not pulsate so strongly, and he had some pain and vertigo. On the third day the tumor was less painful, but still pulsated. His breathing was not so comfortable, and in the evening his temperature rose to  $100^{\circ}$ , but fell to normal in the morning, and remained so afterward. On the fourth day dyspnœa and slight cyanosis appeared. On the seventh day he was better than before the operation, and had less pain and dyspnœa. By the tenth day the tumor was much less painful, the pulsation visibly diminished, and he could breathe easily lying on his back or left side, which he formerly could not do. During the third week he could swallow and breathe with greater ease, and the tumor felt harder. At the beginning of the fourth week he began to vomit, and to complain of headache. His iodide of potassium was, therefore, stopped. On the twenty-second day a painful, dark-colored spot appeared on one toe, and the man appeared badly. On the twenty-third day he died. No autopsy could be obtained.

In October last I had an opportunity to repeat this operation in the following case: A man, *æt.* 46, free from specific history, was referred to me by Dr. Naughton for treatment of a large pulsating tumor at the root of the neck on the right side. It had been observed as a very small swelling above the clavicle, not more than a year before, and had steadily enlarged until now it filled the supra-clavicular space, extending backward to the scapula. The greater growth of late had been back of the middle plane of the neck. A loud bruit could be heard over its entire surface. Its pulsation lifted the shoulder at every beat. Neuralgic pain of the right shoulder and arm had been coming on for several weeks, and pressure on the brachial plexus caused paralysis of the deltoid and triceps muscles. The right arm and right half of the face remained dry, while the opposite side was covered with profuse perspiration. There was slight hoarseness. The right pupil was smaller than the left, and ptosis of this eye had developed. The axillary, brachial, and radial pulses were small. A diagnosis of dissecting aneurism of the subclavian was made.

After consultation (Drs. Sands, Weir, Peters, McBurney, Bangs, Lange and Bull) it was decided that the condition would not be checked even by ligature of the carotid, with

shoulder amputation, and being left with a patient whose pain was only eased by frequent hypodermatics of morphine, while the growth of the aneurism could be seen to advance every day, I decided to resort to Barwell's method, to lengthen his life, and, perhaps, to lessen the pain. The oval cavity of the tumor was estimated to measure four by five inches.

After three weeks' observation, under iodide of potassium, I decided to use catgut before employing wire. I operated on November 19, no anæsthetic being given. With a No. 2 aspirator-needle, I pierced the front of the sac, and the blood spirted out to a distance of two or three inches. No. 1 catgut, taken fresh from juniper-oil, and drawn through a damp sublimated towel, was easily, though slowly, pushed into the sac. It was best fed by short grasps of the thumb forceps. One hundred feet of it were thus introduced, occupying an hour. The patient lost two or three ounces of blood only, and had no pain, or discomfort whatever. There was a slight rise of temperature (to  $101^{\circ}$  F.), on the following day, the pulse remaining unchanged. The tumor was a little warmer than before. On the second day the patient continued to feel well. The outer third of the sac had very decidedly hardened; the remainder pulsated as before. An ice-bag was ordered to be applied. The radial and brachial pulses could not be felt. The hand continued warm. On the third day his temperature rose to  $102^{\circ}$ , though he felt otherwise as well as he did before the operation. After that his temperature declined rapidly to normal. The tumor, however, grew decidedly backward and upward during the week, and lifted the scapula. On the eighth day the dissection seemed much more rapid, and the hoarseness amounted to aphonia.

On the ninth day Dr. Roosevelt very kindly assisted me, and I introduced through an insulated aspirator-needle one hundred and fifty feet of fine steel wire, sterilized by boiling in carbolic acid solution; a copper plate a foot square, covered with cotton, was placed over his back and was connected with the negative pole, and the positive was attached to the end of the wire. A current was measured by Dr. Roosevelt up to fifty milliamperes, which was the limit of the register. This required but fifteen cells; the entire thirty-six cells of the gal-

vano-faradic battery were subsequently applied. The patient experienced no pain or discomfort. His pulse which had been 110, rose only ten beats during the process.' The current was continued for an hour—the latter part of the time reversed so as to bring the negative pole within. He was rather exhilarated than otherwise; and when removed to bed would not have known that any operation had been done.

The tumor still pulsated when we concluded. On the following day I could perceive an increased firmness in the walls, though the pulsation continued. Subsequently the patient felt rather better, and I had some hopes of the outcome, when, on the second evening, he suddenly had a rupture of the sac into the trachea and expired. It was impossible to obtain an autopsy.

Although it is to be regretted that these cases could not be followed to the post-mortem table, there are yet some points of value in each that may be added to the study of the subject. It will be seen that both were utterly hopeless cases, and, while we cannot assert that life was prolonged, it was not shortened by the operation. In my own case the man was approaching his end, and it was his only hope.

The question may be asked, whether the rupture of the sac into the trachea was hastened by the pressure of the wire inside. I judge not, for the tracheal pressure that preceded the rupture had been progressively getting worse, as evidenced by the hoarseness increasing for a month—showing that it was making its way toward the trachea. I find three other cases of rupture following active treatment. One of Churton's last year, in which he had used electro-puncture without wire, and in twenty minutes fatal hemorrhage from the trachea ensued; the other was Donville's case of aortic aneurism, in which he put fourteen inches of iron wire into a sac, and when four weeks later the man died of sudden rupture into the pleura, it was found that no wire was near the perforation. The same occurred in Dr. Ransohoff's case, reported at the last meeting of the American Medical Association; over ten feet of silver wire were introduced into the sac, in two sittings, three weeks apart. Death suddenly occurred one week after the last, from rupture into the pleura, but the autopsy showed that there was

no wire near the place of rupture. (*The Medical News*, May 29, 1886, page 597.

Whether the duration of life was longer or shorter owing to the treatment by wire insertion, is pure speculation. My own impression is, from studying all the cases, that without exception everyone was in a desperate state before operation. Some even threatened dissolution. My own patients lived thirty-six hours only, before rupture occurred. Most of them lived several weeks, and Loreta's, ninety-two days, having apparently been restored to health, while Morse's still survives. In one case reported by Mr. W. Cayley, the large aneurism at the root of the neck became solid and the patient lived eighty-six days after some forty feet of steel wire were introduced. The thoracic portion of the aneurism extended, and Mr. Gould subsequently put in thirty-five feet more to solidify if possible the portion that was causing serious dyspnœa. No disturbance followed nor was he relieved.

As regards the chances of emboli from the wire giving trouble, I find but two of the fifteen cases in which wire was introduced, that caused such an accident. Mr. Moore's case, the first on record, showed at the post-mortem suppurating foci in the kidneys, with death on the fifth day. As the case occurred in 1864, it is quite as probable these were septic as that they were embolic. No case that has since been done has shown septic infection due to the care now exercised in sterilizing the wire.

In a note in the *British Medical Journal* of May, 1885, Dr. Maclean, who witnessed Mr. Moore's operation twenty-three years ago, and who saw the organs and aneurism after the autopsy, says that the immediate cause of death was inflammation of the sac and the pericardium, and also he recalls the innumerable clots in the fresh preparation, of varying consistence, hanging from the wires, ready to drop into the blood, and emboli exactly like them were found in the arteries of the organs dissected to show them." In Dr. Roosevelt's case a dark-colored, painful spot appeared on one toe on the twenty-sixth day. The absence of other reported accidents by emboli, shows that it is no more to be feared from wires than from the untreated walls of an aneurism.

Having shown that nature will tolerate considerable quantities of wire for periods of eighty-six and ninety-two days, and even indefinitely in favorable cases, as in Dr. Morse's, and that it has never been known to induce suppuration when aseptic, it is now of importance to see how much solidification is really brought about by the foreign substance. Of the sixteen cases of wire-insertion, eight were followed to an autopsy. Bacelli's third case, in which seven watch-springs, each about twenty inches long, were inserted, was the only one which failed to show coagulation. The patient lived only two days. His second case, in which three springs were introduced, lived ten days, and excellent clots were found around the metal. His first case, in which only one spring was used, lived two months, was improved, and presumably the wire was imbedded. In Domville's case fourteen inches of iron wire were found imbedded in firm clot, two weeks after its introduction into an aortic aneurism, the patient dying of ruptured sac. Dr. Ransohoff reported last year a case of large aneurism at the root of the neck, into which he put at two sittings ninety-eight and ninety-six inches of silver wire. The case was hopeless from the first; however, the patient survived over four weeks. Autopsy showed the "coils of wire imbedded in recent and old clot." In Mr. Cayley's case of large sacculated aneurism of the aortic arch, the patient survived the introduction of seventy-five feet of steel wire eighty-six days, and the "entire upper portion of the sac was filled with clot, in which the wire was imbedded." In Barwell's case (already quoted) the electricity and wire combined had caused the latter to become "surrounded by thick, firm, colorless clot, which in many places bound the wire to the sack-walls, thus strengthening them." In Prof. Loreta's famous case (reported last summer) the post-mortem revelations were very gratifying. The patient was a sailor, who had aneurism of the abdominal aorta, the size of a small foetal head. Laparotomy showed it to be matted to the viscera, stomach, etc., from which it was separated. Six and a half feet of silvered copper-wire were introduced through a fine canula, the point of perforation was touched with pure carbolic acid, and the wound was closed. He made an excellent recovery. Twenty days later the pulsation had



ceased, and by the seventieth day he resumed his work. On the ninety-second day the aorta ruptured at the point at which the sac sprang from it. Autopsy showed that the latter had shrunk to the size of a walnut, and was completely filled with coagula of organized fibrin. The wire was found unaltered, and rolled into a globular mass within the sac.

Dr. Morse's patient, in San Francisco, a man of thirty-two years, received a blow from a coal bucket which resulted in an aneurism of the abdominal aorta, which grew for eight months, accompanied with much suffering. Loreta's operation was done, and four and a half feet of silvered copper wire introduced into the sac through the laparotomy wound. The tumor was the size of two fists.

The patient's subsequent temperature remained below  $101^{\circ}$ .

On the ninth day the left femoral artery became plugged, whether from embolism or endarteritis cannot be said. Pulsation returned in it, however, in the fourth week. The tumor shrank to a small nodule, and so remained without bruit. The patient left the hospital less than eight weeks after the operation—apparently cured.

Dr. Lange reported a case to our society quite recently, in which he obtained an autopsy. He had inserted thirty feet of wire into an abdominal aneurism. The patient survived twelve days. The specimen showed the wire imbedded, to a large extent, in firm clots against the wall, but free in some places in the current. It is reasonable to believe that it would always be buried in laminated clot, if left for a while.

As bearing upon this point, I would note that Schrötter, of Vienna, two years ago inserted twenty inches of Florence-silk into a large aneurism, and four days afterward thirty inches more. The patient died in the third week, of pulmonary œdema, and the autopsy showed the silk in coils entirely enclosed in laminated clot. In Bryant's case of popliteal aneurism, the horse-hair was enveloped (to use his words) in "huge laminated clots." The inflammation of the sac-wall probably plays no small part in aiding solidification. I feel convinced that it is desirable to provoke some inflammation. In my patient there was a decided increase of local temperature in the outer part of the sac, with slight cedema of the subcutaneous tissue,



and hardening of the sac. This followed on the second day, after one hundred feet of catgut had been introduced. The continuous application of an ice-bag entirely controlled the inflammatory action. In Schrötter's case of silk introduction it is reported that "intense œdema appeared in the vicinity of the sac from its inflammation," the virtue of which was apparent, in the imbedding of the silk, as was found three weeks later at autopsy.

Finally, I would review the part that electricity may play in the combined treatment. We have but three cases in which the sac was subjected to electrolytic action through an extensive wire coil within it. Barwell used a current of ten milliamperes, Dr. Roosevelt about twenty-five, and I one hundred. The patients experienced no pain or discomfort whatever. The current was passed for a period of from half an hour to an hour and ten minutes. In my case the current was reversed during the latter half hour, so as to bring the negative pole within. No change in the patient's condition could be perceived, and no gas could be discovered in the sac, as in some cases of electro-puncture, where it became tympanitic for a short time, without harm.

The promising statements of Cinicelli and others about the value of electrolysis in aneurisms have seemed to many delusive. The small amount of coagulation that takes place around a fine needle, is perhaps of less value than the irritation of the sac. Therefore, it seems reasonable to my mind that if we tangle a mass of fine wire so that it will reach every part of the sac, and then cause a deposition of clot on it by electrolysis, we do more justice to the method. Cinicelli claims that no cure of aneurisms takes place after electrolysis without inflammation of the sac.

Occasionally a case succeeds, as one reported by Dr. Simpson, of Manchester, in 1881; an aortic aneurism that had eroded the rib and threatened to rupture, continued well five years after repeated electro-puncture.

As regards the strength of the current to be applied, experience only will say. De Watteville thinks that twenty or thirty milliamperes for each needle are sufficient, others five or

ten. But, when a large wire surface transmits the current, it is probable that fifty or one hundred are not too strong.

CONCLUSIONS.—It is evident that we need many accurate scientific observations before we can speak definitely of the value of Barwell's method. One may say that Moore's treatment, by simply placing wire in the sac, has not yet been tried in any case that was not already hopeless and in the last days of life. The same may be said of Barwell's; yet the evidence warrants a continuance of its trial. It is not a coincidence that cases show a decided amelioration of symptoms.

It has been proved that there is a deposition of clot; sometimes so abundant as to cure, as in the cases of Loreta and Morse. The fine wire is so yielding that it may be compressed by the aneurismal contraction into a small fraction of its bulk, without exerting much expansile reaction against the wall; and it is probable that an hour's electrolysis so far weakens it, as well as roughens its surface, that it is quite prepared for the deposition of the clot and the shrinkage of the sac.

The operation is not in itself perilous; no deaths have occurred from its performance. The subsequent much-desired inflammation of the sac was easily kept under control by ice-bags in every case.

The principle does not seem faulty, and its application should not be abandoned or condemned, until much more extended trial has been given to it.

## EXSECTION OF THE KNEE-JOINT FOR TUBERCULOSIS.<sup>1</sup>

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WHITE swelling of the knee-joint in adults of the laboring class can, for various external reasons, rarely be treated by orthopædic measures. In children a rational mechanical and general treatment will often reward the patience and skill of the physician by excellent results. Exsection of the knee-joint in infants is to be avoided as long as possible, on account of the great shortening that is caused by the removal of the epiphysis adjoining the knee, on which depends the growth of the thigh and tibia. In adults exsection is the shortest and safest way of eliminating tedious morbid processes and substituting firm ankylosis for a useless joint.

Arthrectomy, or exsection of the capsular ligament alone, as suggested by Volkmann, has not been attended with good success in the experience of the writer. Two cases, one in an adult, the other in a child, resulted in relapse of the tubercular affection, although great care was taken in removing the entire capsule. A third case was permanently cured. The following are brief synopses of these cases:

CASE I.—S. L., metal worker, æt. 27 years. On February 28, 1882, arthrectomy was performed, the patella being removed for fungous arthritis of the knee-joint. Primary union occurred. On March 22 the disease occurred in the cicatrix, and gradually involved the articular surface of the femur and tibia. Amputation was performed by Dr. J. Adler.

CASE II.—Fred. O., æt. 5½ years. Tubercular arthritis of the knee-joint. On January 26, 1887, arthrectomy was performed at the German Hospital. On March 22 the entire cavity was opened and

<sup>1</sup>Read at a meeting of the New York Surgical Society May 25, 1887

scraped because of recurrence of the disease. At the present date the boy is still under treatment.

CASE III.—George K., butcher, æt. 26 years. On July 6, 1882, arthrectomy was performed at the German Hospital; a carious patella being removed. On November 5 he was discharged cured, with slight mobility of the joint.

In children exsection should be made only under very urgent, especially vital indications, and should be strictly limited to the removal of diseased parts. By following Schede's plan of dressing the wound, the hollow spaces remaining between the opposite joint-surfaces will be filled by an organizing blood clot, and firm union without suppuration may be obtained.

CASE IV.—Eva G., æt. 8 years. Osseous tuberculosis of the knee-joint, with a sequestrum in the external condyle; granular osteitis of internal condyle, and multiple cheesy deposits in the thickened capsule; subluxation backward of the tibia, with rectangular contraction. On August 12, 1886, partial exsection of the knee-joint was performed at Mt. Sinai Hospital. After the removal of the sequestrum a deep recess was left behind the inter-condylar notch. The patella and the entire capsule were removed; the hamstring tendons were divided to prevent recontraction. The tibia was pared superficially, and the bones were held in apposition by a nail driven diagonally through the femur and tibia. A plaster-of-Paris bandage was applied over Schede's dressing. The patient had an attack of erysipelas. By reason of these complications healing was delayed.

On February 27, 1887, the patient was discharged cured, with firm ankylosis.

Total exsection of the knee-joint is usually performed by the writer in the following manner: After careful scrubbing and disinfection of the region of the knee, the foot, the leg, and the thigh of the diseased limb are enveloped in clean towels, wrung out in corrosive sublimate solution. The limb is elevated vertically for five minutes in order to deplete its vessels, and the constricting band is applied high up on the thigh. The knee is flexed, and an incision, commencing at the middle of the condyle of the femur and extending in a semicircular line *above* the patella to the middle of the other condyle, is carried into the joint. The transverse incision above the patella, proposed by Eugene Hahn, of Berlin, has many advantages over the incision made below the patella. The chief one is the free access which it affords to the bursa of the quadriceps, which must be carefully exsected along with the capsule.

The crucial ligaments are divided close to their attachment to the femur and the patella, the semilunar cartilages, and the entire capsule, together with the bursa of the quadriceps, are excised with mouse-tooth forceps and curved scissors. Care must be taken not to overlook some small bursæ situated behind the head of the tibia, which regularly communicate with the interior of the joint. The condyles of the femur are sawed off, the plane of section corresponding to the transverse diameter of the epiphysis of the femur. Disregard of this rule will lead to ankylosis in such a position that the patient will be bow-legged. The articular surface of the tibia is sawn at a right angle to the long axis of this bone. All visible orifices of vessels are secured by ligatures; they can be recognized by compressing the vicinity of the wound with both hands.

If the transverse incision was not made long enough to permit of an easy arrangement of the drainage tubes in the angle of the wound, it should be sufficiently lengthened. The inner ends of the tubes should reach into the popliteal space, just behind the sawn surfaces, and the tubes must not be compressed and occluded by the tension of the soft parts surrounding them. The limb is placed upon a long cushion covered with a clean towel wrung out of corrosive sublimate solution, and, while the sawn surfaces are held in exact apposition, from two to four long steel nails, previously well disinfected by heating in an alcohol flame, are driven diagonally through the femur and tibia, so as to lock the bones firmly in the desired position. The cutaneous incision is united by a sufficient number of catgut sutures. The limb is raised by the foot from the cushion, which is then removed. Strips of disinfected rubber tissue are slipped under the safety pins securing the ends of the trimmed drainage tubes, and an oblong compress of iodoform gauze is laid over the entire line of union. A suitable number of sublimated gauze compresses are arranged around the knee-joint, and two short lateral splints of veneering, or thin board, are firmly bandaged on to serve as a deep support. Over these is placed an ample external dressing of corrosive sublimate gauze, also firmly secured by a gauze bandage. The towels are removed, and the uncovered parts of the limb are enveloped in a layer of borated cotton, so as to equalize its outline. Two long lateral pasteboard splints, secured by muslin or crinoline, complete the dressing for children or adolescents.

In adults, the limbs being stouter, are better secured by a firm circular plaster-of-Paris splint. The limb is elevated vertically, and the constricting rubber band is removed. The return of the circulation is



attested by the pink color of the toes. As soon as these turn pale, the extremity can be brought to the horizontal position.

If asepticism was well maintained the operation will be followed by slight aseptic fever, and no severe pain. The dressings should remain undisturbed for thirty days, so as to afford a good chance for bony union. After this period the splints and dressings can be removed, and the nails and drainage tube can be withdrawn. The remaining sinuses are dressed lightly, the limb is encased in a silicate of soda splint, and the patient is ordered to walk about on crutches, whether osseous union is present or not. Gradually the crutches are dispensed with, and the patients generally learn to walk very well on an elevated sole, which compensates for the shortening.

Of twelve cases of total exsection performed by the writer for tuberculosis, eleven recovered, and one died of meningeal tuberculosis. The history of the fatal case was as follows:

CASE V.—Fred. F., æt. 7 years. Osseous tuberculosis after arthrectomy performed by Dr. F. Lange, in June, 1885. On March 4, 1884, total exsection was done at the German Hospital. The operation revealed two periarticular abscesses and five cheesy foci in the tibia and femur. Suppuration of the wound occurred. On March 10 an abscess on the outer aspect of the knee was incised. On April 23 separation of the epiphysis of the tibia took place: the separated epiphysis was firmly united to the femur. Symptoms of meningeal tuberculosis developed, to which the patient succumbed May 31.

In one of the remaining eleven cases amputation of the thigh became necessary on account of suppuration. The following is a brief synopsis of this case:

CASE VI.—H. D., professional athlete, æt. 30 years. Extensive destruction of the right knee-joint by tuberculosis, complicated with pyogenic infection. The knee, leg and thigh contained a large number of abscesses; there was profuse secretion, from seven fistulæ. The case was not suitable for exsection and amputation was advised; but, at the patient's earnest request that an attempt should be made to save his limb, total exsection was done at the German Hospital, on February 14, 1884. As suppuration was expected the extremity was fixed to an interrupted dorsal suspension splint, made of hoop iron, by plaster bandages. Profuse suppuration followed, attended with evident prostration. On April 19 the thigh was amputated. The wound healed by granulation, and in June the patient was discharged cured.

Ten cases were cured in which the limb was preserved; in nine of



these firm, bony ankylosis was secured. In one there was ligamentous union, viz.:

CASE VII.—Nicolas G, a carpenter, æt. 54 years. Synovial tuberculosis, with high temperature and emaciation, following slight traumatism. Contraction of the knee at an acute angle, with constant violent pain. On February 19, 1886, a puncture was made at the German Hospital, a small quantity of turbid, bloody serum being withdrawn. Under an anæsthetic the limb was straightened, and the joint was incised, irrigated and drained. The fever at once disappeared, but flocculent pus commenced to flow from the tube, confirming the assumption that tuberculosis was present. In view of the patient's age, and his wretched general condition, which was due partly to disease and partly to chronic alcoholism, amputation was thought to be advisable. The plan of operation was changed at the operating table, and total exsection of the knee-joint was done. Hæmorrhagic synovitis, and a large cheesy deposit in the bursa of the quadriceps, were found. Five nails were introduced, and an aseptic dressing was applied, with paste-board splints. Temporary compression with Martin's bandage was employed, in order to control the secondary oozing. The dressing was changed on the twenty-second day. Four nails were found to be loose, and were withdrawn. On May 8, the drainage tracks were scraped, and the fifth nail was removed. Ligamentous union had taken place. A plaster-of-Paris splint was applied. By June 12 the sinuses had healed, and the patient was walking without a stick or crutches, wearing a light silicate-of-soda splint, though union of the bones was not perfect.

The following are brief notes of the other nine cases:

CASE VIII. Willie B., æt.  $3\frac{1}{2}$  years. Osseous tuberculosis with fistulæ. Total exsection was performed February 2, 1878. April 2, patient was discharged cured.

CASE IX.—Charles H. æt. 12 years. Osseous tuberculosis, with fistulæ; contracture and subluxation backward. Total exsection, June 13, 1884, at German Hospital. Hahn's incision was made, made, two nails were introduced, and a plaster-of-Paris splint applied. Some fever and deep-seated œdema of the region of the knee followed. The sawn surfaces and the flesh united by first intention. The nails being withdrawn on the twelfth day, some pus exuded from their tracks, showing that they had apparently not been well disinfected. Several revisions were required on account of the development of unhealthy granulations in the drainage holes. On February 4, 1884, the patient was discharged with firm ankylosis and no fistulæ.

CASE X.—S. B., æt. 9 years. Osseous tuberculosis. several fistulæ, subluxation. August 26, 1885, total exsection at Mt. Sinai Hospital. Nails were introduced and a plaster-of-Paris dressing applied. September 25 the dressing was changed, and the nails and drainage tubes were withdrawn; firm ankylosis. October 10, patient discharged cured.

CASE XI.—Leonard P., waiter, æt. 19 years. Synovial tuberculosis, no fistulæ. August 25, 1885, total exsection at the German Hospital. September 27, plaster-of-Paris splint, dressings, drainage tubes, and nails removed. October 9, sinuses healed. October 18, discharged cured with firm ankylosis.

CASE XII.—Bertha D., æt. 12 years. Synovial tuberculosis of five weeks' standing. Continuous high fever, with rapid emaciation. A puncture yielded a small amount of bloody serum. January 21, 1886, total exsection at Mt. Sinai Hospital. The capsule was found studded with innumerable miliary tubercles. The fever disappeared immediately after the operation. February 20 the plaster splint was renewed and the wound was found to have healed by first intention. March 10 the patient was discharged cured with firm ankylosis.

CASE XIII.—Lizzie B., æt. 20 years. Osseous tuberculosis of eighteen years' standing; rectangular contraction with subluxation backward. February 12, 1886, total exsection at the German Hospital. March 10, change of dressing, three nails and the drainage tube being removed; primary union. April 4, patient complained of a good deal of pain in walking. A hard body could be felt under the skin on the outer aspect of the tibia. An incision exposed the head of the fourth nail, which had not been found at the first change of dressings. It was withdrawn with some force, a little blood exuding from its track. May 9, patient discharged cured.

CASE XIV.—Anna L., æt. 22 years. Synovial tuberculosis with ulceration of the articular surfaces of both the femur and the tibia. May 10, 1886, total exsection at the German Hospital. June 12, first change of dressings. Primary union of the soft parts; delayed union of the bones. August 1, discharged cured with firm ankylosis.

CASE XV.—Synovial tuberculosis, with caseous deposits in several recesses of the capsule, notably around and behind the crucial ligaments. Caries of the articular surfaces. May 18, 1886, total exsection at the German Hospital, the operation being followed by slight fever. Dressings removed May 20, showing marginal slough of the upper edge of the skin-wound. June 17, nails removed. Firm ankylosis. July 26, patient discharged cured.

CASE XVI, Emina F., æt. 27 years. Synovial tuberculosis, with caries of the articular surfaces. April 18, 1887, total exsection. April 22, considerable amount of secondary oozing, necessitating a change of the external dressings and plaster splint. There was some fever. May 23, dressing changed; primary union, with firm ankylosis. The tubes and three nails were removed; a fourth nail could not be found. To prevent the disagreeable necessity of cutting down in search of a nail buried in the tissues, Dr. F. Lange's suggestion of fastening a silk ligature to the head of each nail before driving it in, seems to be very appropriate. June 4, an incision was made over the seat of the fourth nail, which had healed in completely and it was withdrawn.

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CASE OF RECOVERY FROM STAB-WOUND OF  
ABDOMEN, WITH WOUND OF COLIC AR-  
TERY, AND LARGE, LONG CONTIN-  
UED AND FILTH INFECTED  
BOWEL-PROTRUSION.

By A. R. JENKINS, M.D.,

OF HENDERSON, KY.

AT midnight of July 1, 1887, I was called to see a negro man who had been stabbed in the abdomen. Found him lying upon a dirty porch, and covered over by a filthy feather mattress, his body reeking in blood, vomit, perspiration, urine and dung, and in deep collapse. Removed mattress, found enormous protrusion of intestine, on the surface and in the folds of which were clotted blood, numerous chicken feathers from mattress, and other miscellaneous filth. The fellow's dirty hands were lying in the mass unconsciously endeavoring to support it. The intestinal tumor was cold, cyanosed and congested—this was about two hours after he had been cut. Warm water was presently got and carbolized to 5% into which some cotton underclothes (soiled) were dipped and the guts enveloped in them. After a short consultation with my colleague, Dr. J. Y. Brown, we agreed even in the face of the filthy environment and poor light (two chimneyless lamps) to proceed to the restitution of the intestines by a methodical laparotomy. The guts were irrigated with a warm 5% carbol solution, and were systematically searched through and

cleansed. The tumor consisted of the following procession of intestine: colon transversum with its mesocolon, entire omentum, about two feet of jejunum and its mesentery; guts in medium grade of tympany. Found more feathers in folds of mesentery and omentum. There was a cut in the meso-colon, involving about two-thirds of its thickness, situated about midway between its fixed border and transverse colon. The cut was about 3 ctm. long, transverse in direction, and evidently made by the point of the knife. The clot being rubbed out of the cut it began bleeding in a weak diffused jet. The bleeding vessels had retracted into the tissues of the meso colon and could not be caught by forceps until the peritoneum on the superior surface was scissored up. The severed arteries were the main right branch of the arteria colica media and a branch thereof. Ligated proximal and distal ends with sublimatized catgut. Iodoformed wound. This part of the operation was most difficult, owing to the poor flickering light; several candle moths also fell upon the peritoneal field of operation. Digital exploration of the wound in the wall of the belly was made beneath the guts. It was found to be transverse in direction, a little to the right from middle of epigastric region, about 5 ctm. long, slanting inward to the right, the right rectus abdominis entirely severed, the circumference of the wound tightly strangulating the expressed bowel (thus probably preventing lethal hæmorrhage from the arteria colica media). Systematic reduction was attempted in narcosis but failed. The wound was then enlarged by an incision extending from its inner angle to the umbilicus, after which restitution was effected. The peritoneum of the extrusion had become glazed and opaque from the long action of the carbolic. The various peritoneal apartments were sought out, particularly Douglass' sac and the recessus duodeno-jejunalis, and wiped with sublimate gauze; only light blood staining, serum seemed in excess. Air expressed, wound closed with eight deep silk sutures, snowed external wound under with iodoform, sublimate gauze dressing. The only bad symptoms that followed were decided intestinal tympany on third day with slight abdominal pain (no morphia used). His temperature on that day registered the highest—101°. He left hospital on July 19 apparently well.

The several items in this case for which special consideration is asked are the following: (1) The long continued exposure of the peritoneum (about three hours); (2) the wonderful opportunity for severe infection on such a delectable *locus minoris resistentiæ*. Doubtless infection did take place, but

the carbol was at hand and destroyed the germs on the superficies of the peritoneum, and in all probability overtook and paralyzed others in the peritoneal lymphatics. (3) The almost entire absence of blood in the peritoneal cavity, the severed *arteria colica med.* must have bled freely into the peritoneum before it made its escape through the external wound. If so, whatever the quantity was, it must have been absorbed in this short time (but little blood gained access to peritoneum from the section wound). (4) The technique of the wounded mesenteric artery.

Do cut mesenteric arteries retract into the tissues of the mesentery as they did in this case? I have not seen or found a report of a case in point. In this case it certainly did make a severe complication of technique, and made thoughts of Jourdan's pessimistic teachings on that point too apropos. The escape of the intestine from wounding in this case is reminiscent of the experiments of Hermann and Albrecht, who often with cadavers succeeded in stabbing them in the abdomen without wounding the bowel. (Koenig).

## EDITORIAL ARTICLES.

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### ETHER OR CHLOROFORM—WHICH?

The important question as to the choice of an anæsthetic is by no means the simple affair which the partisans of one or the other claim it to be. Recent discussions on this subject in the British Medical Association, in the Academy of Medicine in New York, and in the County Medical Society in Brooklyn, together with many editorial and other contributions in various medical journals, have served to call attention to the various phases of this subject. Perhaps the most important of all the lessons to be derived from the facts which have been elicited is the entire unreliability of the statistical comparisons which have heretofore been relied upon to demonstrate the relative safety of the two great anæsthetics—ether and chloroform. It seems to have been quite clearly brought out that while as regards the immediate results from its administration, chloroform has rolled up a death rate far in excess of that produced by ether, still the latter is chargeable with many deaths from later complications determined by it, which are as yet an unknown quantity, though they are now becoming more appreciated.

Shock, defective and delayed reaction, heart-failure, pneumonia, pulmonary œdema, uræmia, nephritis, are terms which in many instances have explained deaths which were properly attributable to ether. The appreciation of these facts must lead to a more careful study of the whole subject of anæsthesia, and to greater attention to its technique by practitioners in general. As a contribution to this subject, Dr. A. B. MILES, of New Orleans, presented a memoir to the Orleans Parish Medical Society, June 27, 1887, which has been published in the August issue of the *New Orleans Medical and Surgical Journal*. In this memoir the relative merits and demerits of ether and chloroform,



together with the conditions of the body which may influence their effects when administered for anæsthesia, are presented and discussed with great discrimination and clearness. With this preface we reproduce the greater part of it, which will be found to be worthy of careful study.

“Ether is the weaker anæsthetic, possessing the peculiar toxic quality in less degree than chloroform. In small quantity it is decidedly stimulating to the cerebrum and to the vital functions over which the medulla presides; and, in this action, it is more uniform than chloroform. Indeed, the vital reflexes are so uniformly stimulated by ether that the danger of its primary effect in healthy subjects is as small as possible under general anæsthesia. In those who take ether well, the stimulating effect on the heart’s action and respiration may be observed throughout the anæsthesia. Ordinarily, even anæsthetic doses of ether do not depress these functions, but leave them to themselves, uninfluenced by the general anæsthetic action. Under etherization the heart’s action and respiration are certainly less liable to the irregularities, which are not unfrequently observed in chloroform anæsthesia. In the latter stages of etherization, however, the vital reflexes may be depressed and powerfully, but gradually, so as to give warning of the approach of danger. Ether danger usually approaches by way of the lungs, and usually forewarns by the labored, stertorous, irregular breathing, and cyanosis, so as to allow the use of means to avert. Ether danger may, however, approach by the heart. In ten of forty well authenticated ether deaths the heart failed first. These deaths resemble chloroform deaths, but comparatively occur much less frequently. So the comparative safety of ether and its timely admonition of danger are its chief advantages. They are certainly points of great practical value in its favor.

Against the merits of ether stand in stronger relief to-day than ever before its disadvantages and its dangers. The advocates of ether, who use it excessively, especially those who yet believe in its absolute safety, are doing much to day to demonstrate its dangers. Its inflammability in the presence of artificial light and the actual cauteries is one objection. The danger of igniting is modified by several con-

ditions: the proximity of the light, its position, and whether exposed or not, the saturation of the surrounding air and the direction of the air currents. Ether may ignite at long distances (fifteen feet, it is said) if the currents set in the direction of an exposed light. But the dangers of inflammability may be modified, as above indicated, and much diminished. The exceedingly disagreeable odor and the irritating property of ether, when brought in contact with mucous surfaces, are serious disadvantages. It was this irritating property which refuted the claims of rectal etherization as a warrantable procedure in surgery, but not until it had brought sorrow on its advocates and a worse fate on some of its victims—diarrhœa, dysentery, hæmorrhage, collapse, death. The irritation of the respiratory mucous membrane usually causes coughing, strangling and violent resistance. It may cause catarrhal bronchitis and pneumonia. It may very seriously aggravate a pre-existing bronchial or parenchymatous inflammation.

The excessive secretion which ether causes to flow into the breathing passages, is also a disadvantage not to be lightly regarded. This may endanger life by suffocation, especially in cases of pulmonary disease, already attended with free secretion, as in the catarrhal affections of children and old people. It not unfrequently prolongs the asphyxia caused by the usual method of administering ether.

Patients are usually asphyxiated while being anæsthetized with ether. True the asphyxia favors the anæsthetic effect of ether, and therefore obviates the necessity of too greatly saturating the blood. But the asphyxia complicates and increases the danger of anæsthesia. The dangers of such a state are beyond question. They are not so immediate as those of chloroform, and, therefore, have been less apparent and less appreciated.

Asphyxia, as well as etherization, may be carried too far, and at times result disastrously. The respiratory nervous apparatus is exhausted and the heart fails secondarily. The tone of its own texture is destroyed by the supply of venous blood, and by impediment to the pulmonary circulation, its right ventricle becomes overdistended and powerless. So, etherization, as much from asphyxia due to the manner of administration, as from its anæsthetic affect, may depress the

heart's action, as well as respiration. But the sequelæ of etherization are matters of more serious importance, to which attention is specially directed.

Aside from the danger of inflammatory diseases, caused by the irritating ether vapor, is the liability to pneumonia, as the result of obstructed pulmonary circulation.

Again, the asphyxia which goes along with etherization may increase the patient's depression and retard reaction. The deleterious blood changes in a patient who has undergone prolonged etherization, cannot be well suited to the healing of important wounds. In the suffocating plan of administering ether the blood suffers not alone of the interruption to the interchange of gases, but as much of the rebreathing of excrementitious albuminoid products which physiologists tell us are so harmful.

The danger of nephritis, by the action of blood saturated with ether, first pointed out by Dr. Emmet, of New York, has been authentically confirmed by many observers. Healthy organs may be acutely inflamed and those previously diseased may be greatly aggravated by the passage of such an irritant over their secretory surfaces. The danger to the kidneys led to the general adoption of the method by forced etherization, by which the asphyxia lessens the quantity of the ether required.

Ether more frequently than chloroform causes nausea and vomiting. This is an important consideration in the selection of an anæsthetic to be administered in cases in which persistent retching may interfere with the healing of important wounds.

While the immediate dangers of ether are comparatively slight, those which occur subsequently, to which we have just alluded, are matters of very serious consequence. These dangers weigh heavily against the merits of this anæsthetic.

Now, let us pass in running review the advantages and dangers of chloroform.

Its non-inflammability in the presence of artificial light, or the actual cauteries, is an advantage which increases greatly the range of its usefulness. It is certainly the more agreeable to patients, less irritating

to the sensory nerves of the respiratory passages and the more enduring in its anæsthetic effect. It causes comparatively little increase of mucous secretion. It is easier of administration, and the mode of administration does not entail any other effect than that of a pure and simple anæsthetic. Chloroform is the more energetic agent, possessing the inherent toxical quality in higher degree than ether. This quality, however, does not differ in character from that which ether possesses.

The primary effect of chloroform, as of ether, is stimulating to the cerebrum and the vital functions; but the excitement is less intense and of shorter duration than in etherization. Being the more energetic agent, it requires less saturation of the system for the exercise of its anæsthetic power. This is an important consideration. The practical advantages of chloroform in surgery are very striking. These and its comparative freedom from disastrous sequelæ take away much of the terror of its immediate dangers.

The dangers of chloroform are soon told. They are immediate. If patients do not die during the administration they are comparatively safe. Nearly 50% of deaths by chloroform occur at the outset of the administration. The chief danger of chloroform is paralysis of the nervous apparatus governing circulation and respiration mentioned in the order of frequency. The centres are taken by surprise by the direct and energetic action of chloroform and overwhelmed quickly. This sudden action has given to chloroform the name of being treacherous. It teaches unmistakably the necessity of gradually accustoming the centres to the influence of anæsthetics. We dwell on this point with special emphasis.

A large proportion of deaths by chloroform are reported as occurring suddenly and without warning. These cases are usually reported in a way to lay all the blame on chloroform. While we do not doubt the extreme susceptibility of some patients, which makes them liable to such fatal accidents, we are constrained to believe that in more instances than recorded there are timely admonitions of danger. These admonitions are irregularities of the heart's action and respiration. Experiments on animals have shown how, under chloroform anæsthesia, the

heart is liable to sudden irregularities. Clinical experience confirms the observation. Irregularity of the heart's action, as regards the strength of its beats, is especially ominous. The hesitating, irregular respiration of chloroform anæsthesia is but little less valuable as a warning of danger, and certainly demands more attention than usually given. The statistics before mentioned show that in one-fourth of forty cases of chloroform death respiration failed before the heart's action. Patients who breathe irregularly should be anæsthetized with the utmost caution. These irregularities of the heart's action and respiration indicate a condition of the centres which bears anæsthetics badly. This condition is more frequently observed in the anæmic and weakly, and in those under the influence of depressing emotions.

The dangers of ether and of chloroform are modified by methods of administration. Indeed, we feel safe in venturing the assertion that the dangers of anæsthesia lie not more in the inherent property of the agent employed than in the manner of its administration.

The risks are very much greater in the unskilful administration of chloroform than in reckless etherization. In view of the danger of its primary effect, we insist here on the advisability of preparing the way for chloroform. Agents should be given in advance to stimulate the vital reflexes and prepare the nerve centres for the coming anæsthetic effect.

The old-fashioned whisky toddy, taken just before the anæsthetic, still has its votaries. The use of alcohol in this way is objectionable. We cannot rely on absorption from the stomach at the very time its stimulating action is most desirable. If given immediately before the anæsthetic, it is not absorbed in time to sustain the centres as they undergo primary anæsthesia. If given in time for absorption, the alcohol antagonizes the action of the anæsthetic. Alcoholic patients are difficult to anæsthetize, and while under anæsthesia, they often show alarming symptoms.

Again, alcohol is uncertain in the physiological action for which it is given. In many subjects, by abuse, perhaps it may have long since lost its medicinal virtue, while in others its effect may be variable because of nervous susceptibility. Alcohol taken into the stomach be-



fore anæsthesia has the effect of exciting many patients after a surgical operation, at the time when it is most desirable that they should be calm. This excitement may increase the liability to inflammation. The maximum good, with the least harm, follows the use of alcohol when administered hypodermatically, or by inhalation at the outset of anæsthesia. The first whiffs of chloroform may well be mixed with the vapor of alcohol.

A few breaths of the vapor of ammonia, in advance of chloroform, act like alcohol, but more potently and without its disagreeable effects.

The method of mixed anæsthesia, by the hypodermatic administration of the sulphate of morphia alone, or in combination with a respiratory stimulant, as the sulphate of atropia, is as sound in physiological principle as useful in practice. The doses of the sulphate of morphia in adults should not exceed one-twelfth to one-sixth of a grain; of the sulphate of atropia, one two-hundredth to one one-hundred and fiftieth of a grain. The atropine acts particularly well in states of bronchial catarrh, in pulmonary diseases and in all cases indicating the action of a respiratory stimulant. The hypodermatic use of morphine, in the doses recommended, secures the primary stimulant effect promptly when desired, aids the anæsthetic in its action, and subsequently promotes the relief necessary after surgical procedures.

A safe way of preparing the centres for chloroform, and one which we strongly recommend, is by stimulating them primarily with the inhalation of ether. The centres more easily adjust themselves to the action of ether. Statistics show that the danger of the first effect of ether is almost infinitesimal. Thus, the anæsthesia is begun with the agent safer at the beginning, and continued with the agent less harmful in its subsequent effects.

There are causes of danger in the administration of chloroform which occur so commonly as to warrant special mention here. Chief among these common causes of fatal accidents is overdosage—an excessive amount in a given time. Patients being anæsthetized with chloroform should never experience the sense of suffocation of which we too frequently hear them complain. Coughing early in the anæs-



thetia is usually an evidence of over-action. Chloroform anæsthesia should be begun with minimum doses—a few drops only—and continued to the degree desired in quantities gradually increasing. To overdosage more than to idiosyncrasy of patients should be attributed most of the accidents by chloroform. Witness the manner in which so many physicians give chloroform, by saturating the inhaler at the outset and forcing the anæsthesia, and there will be less difficulty in explaining many of those deaths that occur with such electric suddenness.

Haste in the administration of chloroform deserves most emphatic condemnation. The anæsthesia should be produced gradually and maintained uniformly. We believe it unsafe to advise patients at the beginning to “take long breaths” with the view of quickly inflating the lungs with saturated air, in order to produce a rapid effect.

In the calm which follows the preliminary excitement chloroform acts with increased energy. The centres are at this moment in a state of exhaustion, and not prepared to have the anæsthesia forced. The depression which follows the primary excitement is a period in which much harm may be done by overdoses of chloroform.

Instead of forcing chloroform anæsthesia, at any time, during its administration, it is better now and then to give the patient a rest spell, in order to refresh the residual air of the lungs. Some of the singularly sudden deaths, of which we read, may be accounted for by the cumulative effect on the centres caused by the sudden absorption of vapor which saturates the residual air.

Statistics are yet wanting by which we can accurately estimate the relative death-rate caused by ether and chloroform. At the meeting of the New York Academy of Medicine, elsewhere mentioned, Dr. Weir reported five deaths by ether in 10,789 surgical operations. One surgeon reported two deaths by ether, occurring in his own practice, in the course of as many months. These figures do not, most probably, include deaths caused by etherization, yet occurring subsequently, which in years past were not so well understood as now. However, the proceedings of the Academy prove very convincingly the dangers of an agent which enjoys an undeserved reputation for its safety.

At the same meeting of the Academy Dr. Knapp, of New York, reported that from 1860 to 1876 he had used chloroform in three thousand cases without a death; that since 1870 he had used ether exclusively, also without a death. The last death of chloroform in our Charity Hospital occurred on the 12th of November, 1881; the subject a tertiary syphilitic with albuminuria, undergoing operation for removal of necrosis of the tibia. This was one of those appalling sudden deaths, most of which occur in patients who are anæmic and wasted by chronic illness. The hospital records do not show the number of cases in which general anæsthetics have been used since 1881, but give the quantity of ether and chloroform consumed, all of which, save the small quantity used for other purposes, was given as a general anæsthetic. In 1881 eighty-eight pounds of chloroform were used, six of ether; in 1882, one hundred and five of chloroform, two of ether; in 1883, one hundred and two and eighteen; in 1884, ninety-four and fourteen; in 1885, one hundred and sixteen and twenty-three; in 1886, eighty-eight and fifty-six; from January 1 to June 1, 1887, fifty-three pounds of chloroform and eighteen of ether. During the five years, 1882 to 1886, inclusive, five hundred and fifteen pounds, or nearly fifty gallons of chloroform, and one hundred and thirteen pounds, or a little more than seventeen gallons of ether, were used in the hospital. During these years 85,680 patients of all diseases have been treated, and, as will appear in the figures showing the relative quantity of ether and chloroform used, the vast majority of the patients requiring general anæsthesia, including seven hundred cases of important surgical operations reported, have been treated with chloroform. The above statements are made simply to convey an approximate idea of the extent to which chloroform has been used in this house since 1881 without fatal accident.<sup>1</sup>

It is our conviction, with the lights before us, that chloroform, carefully administered, with the precautions herein indicated, is as safe as ether administered by the plan generally practiced in America at the

<sup>1</sup>During the civil war Dr. Hunter McGuire collected the reports of 28,000 administrations of chloroform without a death. Nussbaum has recorded 40,000 cases of chloroform anæsthesia without a death. These records are very remarkable.

present day. However, the unskilful administration of chloroform and inattention to its warnings are fraught with so much more danger than attends or follows etherization by the usual method, that we recommend ether in the surgery of adults whenever its use is not contraindicated.

Let us now apply practically what we have written, and in conclusion, sum up those conditions indicating and contraindicating the use of ether and of chloroform.

As a rule, in the surgery of adults, anæsthesia should be begun with ether, and continued with ether, unless contraindicated. The chief contraindications are pre-existing inflammation of the respiratory passages, of the lungs or the kidneys; insusceptibility to the effect of ether, unless given in overdoses; violent excitement, which may endanger the cerebral vessels in the infirm; and local evidences of excessive irritation of the respiratory surfaces.

In all quick operations which can be performed during primary anæsthesia, ether is especially preferable. The danger of its primary effect is insignificant.

Ether is the more applicable in all states of anæmia, acute and chronic; and in states of extreme nervous depression, whether caused by shock, fright or the neurasthenia of chronic disease. These are the conditions in which chloroform deaths have occurred most frequently.

Ether is especially preferable in cardiac diseases and degenerations, where the organ is weak in its action, particularly in those cases in which the heart's feebleness is manifested in irregularity as to the strength of its beats. Such are the hearts that are exhausted by overwork; the dilated hearts of mitral and aortic regurgitation; the hearts which sympathize in states of general ill-health, poorly-nourished, relaxed in tissue, unsteady in action; the hearts of those convalescing of chronic diseases, of patients depleted by exhausting discharges or hemorrhages, of chronic alcoholics, of old syphilitics; and the hearts which have undergone degenerative changes, resulting from disease, or the decay which comes with age.

Chloroform is permissible in cardiac diseases, attended with over-

action of the organ, as in states of compensatory hypertrophy. It is indicated in this condition of the organ, when associated with nephritis. In all diseases and deformities of the heart, whatever murmurs may be heard, if the organ functions well, chloroform may be given if indicated. As there are a great many crippled limbs doing good service, so there are many hearts, altered by past diseases, which yet act so well as to give no trouble. Such hearts are apt to beat more steadily under an anæsthetic than when submitted to the tortures of a painful surgical procedure without it.

Chloroform is preferable whenever a general anæsthetic is required in cases suffering of pulmonary diseases. It is less irritating to the respiratory surfaces, causes but little increase of the mucous secretion, and interferes less with the pulmonary circulation. The contra-indication to ether in these cases is very positive.

In nephritis chloroform is the preferable anæsthetic. In the chronic stage ether is only permissible at the beginning of anæsthesia, to sustain the heart, now usually very weak, and prepare the nerve centres for chloroform. Of all the conditions said to contraindicate both of these general anæsthetics, Bright's diseases are entitled to the most serious consideration. Aside from the asthenic state of heart muscle, respiration is very often impaired, either by pulmonary oedema, or the renal asthma, which results from anæmia of the nerve centres. These conditions in the aggregate make the use of any anæsthetic of maximum danger. The observation of the harmful effect on the kidneys, by blood charged with ether, has been authentically confirmed by a number of writers, and has contributed greatly to a better appreciation of the dangers of ether.

Cases are occasionally met in which ether fails to produce surgical anæsthesia, unless given in an amount to saturate the system to a dangerous degree. Such patients, in our observation, after the preparation of the nervous system by ether, take chloroform very happily and go quickly under its influence.

Chloroform is preferable, then, in all cases that take ether badly, and those in which the anæsthetic power of ether is insufficient unless administered in overdoses.

Chloroform is the preferable anæsthetic in childhood. Statistics show that children, compared with adults, enjoy exceptional immunity from accidents by chloroform. Children bear chloroform so well that many can be anæsthetized during sleep; while, under ether, they struggle and strangle and pass through an agony of indescribable terror.

Shall we use ether or chloroform in the aged and infirm? Here we are dealing with organs as delicate as fragile glassware. The heart is tottering in its action, and the brain is fed by vessels too brittle for any overstrain. Shall we select the milder anæsthetic, the safer for the heart, but which usually excites such violent struggling and such tumult in the circulation as to endanger the cerebral vessels by rupture, and which causes subsequent dangers so serious in infirm people? Or shall we select chloroform, which obviates all the objections to ether, but which unquestionably, in these subjects, acts on the cardiac and respiratory nervous apparatus with increased energy? The condition of the organs endangered in individual cases should decide the choice. In infirm subjects, more especially, anæsthesia should be begun with ether, when not contraindicated, and so continued in those who take it well. If there be much struggling and resistance, or much increased bronchial secretion, or other evidences of the injurious action of ether, then chloroform should be substituted. In our experience, after the first effect of ether, chloroform has proved the preferable agent in most cases of aged and infirm subjects, save those whose hearts are very weak and irregular.

Shall we use ether or chloroform in cases which may be seriously complicated by nausea and vomiting, as in abdominal and gynecological surgery, and the surgery of the cerebrum? The danger of suffocation by vomited matter, especially in etherization, should never be lightly regarded, nor the ill-effects of persistent nausea and retching on the healing of important wounds. Chloroform less frequently than ether causes vomiting, and in emergencies requiring general anæsthesia before the digestion of a meal, is the preferable agent. Indeed, in all cases where obstinate retching after surgical operation might endanger life, chloroform is preferable.

As a measure to prevent nausea and vomiting under anæsthesia we wish to lay stress on the importance of administering the anæsthetic gradually and maintaining the anæsthesia in a uniform degree. Any surprise to the centres, or sudden alteration of their molecular or nutritive changes, may cause nausea. An hypodermatic injection of the sulphate of morphia occasionally has this effect. So, anæsthetics, or other agents acting similarly, when administered interruptedly, act unevenly on the centres, and by such repeated surprises cause nausea. They act like a rough sea.

Chloroform and ether, therefore, have their respective fields of usefulness, in which they are equally serviceable. They are equally dangerous when given in the face of their contraindications. Not until medical men learn to discriminate properly in their choice of these anæsthetics, and recognize the fact that the dangers of general anæsthesia depend as much on the method of administration as on the toxic property of the agent employed, will the risk of fatal accidents ever be reduced to the minimum."

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#### ON THE SUTURE OF NERVES.

An elaborate article on the subject of the "Suture of Nerves" appears from the pen of Dr. Reclus, Agrégé de la Faculté de Paris, in *Le Bulletin Médical*, June 5, 1887, in which the subject is discussed from a physiological standpoint. As the subject is one of the living topics of the day a very full abstract of this paper is subjoined. In connection with this paper, the student will do well to refer to the editorial notices of many recent contributions to this subject to be found in the *ANNALS OF SURGERY*, Vol. I, p. 132, 1885, and to the paper by Markoe, in Vol. II, p. 181, 1885.

Reclus begins by calling attention to the great obscurity which still hovers over the anatomical and functional changes which a nerve undergoes after section, suture and union. In spite of twenty years of patient observations and researches, experimental physiology and practical surgery have not been able to come in accord. If we are



badly enlightened as to the why and the wherefore of our successes, these are at least so brilliant that at this period primary and secondary suture are imposed upon us.

The work of Waller, Vulpian, Ranvier and Tripier on the regeneration of nerves is known. When a nerve trunk has been divided, at the end of a time, varying according to the species of animal—about the fourth or fifth day in man—the peripheral segment loses its properties, it becomes inexcitable, and histological examination gives us the key to this decline. The cells attached to Schwann's sheath swell up, surround themselves with protoplasm, and become hollowed at the expense of the myeline. The protoplasm still grows, attacks the axis cylinder, at first injured and then cut through, and the essential element of the nerve is thus destroyed in the whole extent of the peripheral end. This destruction of the axis cylinder is the chief thing, and the subsequent changes are of less importance. The segmented axial filament united with the masses of myeline soon disappears before the proliferation of the cells, whose nuclei keep dividing. So that on the twentieth day the nerve fibre is only a sheath of Schwann filled with protoplasm and nuclei. Again these elements atrophy, tend to disappear gradually, and finally the sheaths are lost in the midst of the interstitial fibrous tissue.

The central fragment, which remains in connection with the nervous axis, also undergoes important modifications; but instead of being attacked in its whole length, only the extremities of the fibres are altered, the lesions never passing beyond the first annular constriction above the section. In this short piece, the cells proliferate and the myeline is broken up. Here the destructive processes respect the axis cylinder, which becomes, on the contrary, the seat of a special formative activity, to which is due the phenomena of nerve regeneration, commencing about the twentieth day. At the level of the constriction each axis cylinder buds out and gives birth to one, or sometimes to three fibres, covered with myeline, and formed of very short inter-annular segments; these fibres traverse the sheath of Schwann, in the middle of the nuclei and protoplasm, and reach the peripheral fragment. The axis cylinder may be naked, and it is not until after the

first bifurcation that it becomes surrounded with myeline. Thanks to the successive ramifications, a single axis-cylinder gives rise to thirty or forty new ones; so that the number which go to regenerate the distal fragment is very considerable. When the two divided ends are in contact or very near, the axis cylinders of the upper segment have only a short space to traverse in order to reach the lower. If the distance is much greater the two extremities cicatrize independently; the solution of continuity persists, and the isolated lower end is not regenerated; but the interval must then be 5 to 10 centimetres or more, otherwise the young axis cylinders of the proximal segment advance through the fibrous, cicatricial tissue formed between the two ends, thus reaching the distal segment, in which the collapsed sheaths of Schwann contain only a few refracting masses—the remains of the old myeline—a little protoplasm and some nuclei. Now these sheaths receive a greater or less number of the new axis-cylinder, very slender no doubt, but completely formed. According to Mr. Renant they are not contained in Schwann's sheath; sometimes they are placed outside, and roll themselves around like a sprig of a wild vine about a tree trunk, and sometimes they are quite free, forming either straight bundles, in which the fibres often cross one another in a Y-shaped manner, or an interwoven net work.

The nerve is henceforth regenerated; the new fibres can transmit to the muscles excitations of the centres, and can conduct to the centres peripheral impressions. Demonstration of this fact is now beyond doubt, and, when the animals are young, if the section of the nerve has been performed with proper precautions, the essential properties of the nerve are re-established after a variable time. This is what physiology teaches us, and the hope which it allows us to entertain. Does the practice of the surgeons realize them in man?

An old observation of Béclard, a case of Pajot dated in 1853, and that of Tangier in 1864, seemed to plead in favor of nerve regeneration in man. Moreover, the utility of suture was believed in until 1867, when a fact of Richet came to compromise the theory; in a complete section of the median, that surgeon examined the sensibility before suture, and found not without surprise, that it persisted in nearly the

whole extent of the territory supplied by the divided nerve. Explanations were sought, and Richet, and afterwards Tripier, showed that the phenomenon was due to recurrent sensibility.

These authors have proved that, in the upper limb, sensibility persists, enfeebled no doubt, but beyond question, in the parts animated by a sectioned nerve. This retention of sensibility is owing "to the recurrent fibres which the different nerves usually send forth." The anastomoses take place in the region of the terminal plexuses, near the skin or in its substance; they ascend along the different tissues, and are lost later on. After the diarcæsis these fibres remain intact in the peripheral segment, while the direct fibres—those of the nerve itself—degenerate. It is to the former that we owe the persistency of sensibility, since it is these which are unaltered. This theory, besides being unassailable, and which alone could explain numerous observations similar to that of Richet, soon became the exclusive one; retained sensibility replaced recovered sensibility, and regeneration was considered by a number of surgeons only as a feature of young animals. It lost all credit in human pathology, and in 1883, Richelot declared at the "*Société de Chirurgie*," that suture was incapable of producing regeneration in a nerve; the nervous current could not traverse the cicatrix. If sensibility persist it was thanks to collateral paths, and as the analogous paths "are wanting almost completely in motor filaments, movement never reappeared; in those altogether exceptional cases in which it appeared, we must put it down to certain anastomoses, the existence of which is far from being constant."

At the time when Richelot wrote this report, a mass of observations were accumulating which put in evidence the reality of nerve regeneration in man. Page, Braussold, Th. Kölliker, Boegehold, Tillmans and Polaillon, had published the proving facts, and Chaput, in the following year gave us a résumé of sixty-six cases in which nerve suture had been performed with success in two-thirds of the cases. But in these observations the facts are different, the conditions so diverse and the results so often unforeseen and so incomparable that it is necessary to divide them into a certain number of categories, each to be studied by itself.

The cases where, after suture of mixed nerves—at the same time sensitive and motor—such as the median, the radial and the ulnar, sensibility alone returned, should first be eliminated because it is very difficult in these cases to distinguish between retained or recurrent, and regained sensibility. There is often only a difference varying according to the time, or even depending upon the æsthesiometer, and which may not be appreciated; for as much as the initial anæsthesia may cause a passing disturbance, local stupor, or even certain hysterical troubles.

In the present state of science we cannot explain immediate return of sensibility, after placing in contact divided nerve segments, as in the following hitherto unpublished case, reported to the author by his friend, Dr. Paul Segond:

A seamstress, æt. 25, entered at the Hospital Beaujon at 10 o'clock in the morning; two hours before she had fallen on a staircase, and a fragment of a milk jug divided, above the wrist, the greater part of the anterior tendons, the ulnar artery and nerve, and the median nerve. MM. Segond and Rémy examined the sensibility; anæsthesia was complete over the whole region supplied by the two divided nerves. The prick of a needle, and contact of a red-hot stylet, were not felt, and while pinching the upper or central segment of the nerve caused acute pain, vigorous pressure of the lower or peripheral end exhibited none. Suture was at once performed without anæsthetics. As soon as the two ends of each nerve were faced together, tickling could be felt over almost the whole extent of integument innervated by the median and ulnar; ten minutes afterwards the contact of a red-hot stylet or a pin was painful. Thenceforth, sensibility, proved by Weber's compass, seemed to be perfect. Unfortunately, the muscles remained paralyzed and their atrophy persists.

Numerous cases are on record in which, after the suture of divided nerves sensibility and movement have reappeared after a longer or shorter interval, and in which the effect of "recurrence" cannot be invoked as the cause. These are divisible into two groups. The first includes those in which the functions have not been re-established until a considerable time after suture—several weeks or months may in-

tervene from the time when the two ends have been placed in contact. These facts are in accord with physiology, and confirm the assertions of experimenters. The second group comprises the cases where sensibility and motor power have returned so rapidly that one would be tempted to doubt the observations, were it not for their number and for the worth of the surgeons who have published them. The observations of the first class, which we shall call "physiological," in contradistinction to the second or "paradoxical" cases, are not rare. That of Chrétien, of Nancy, will serve as a type. A boy, *æ*t. 18 years, cut the median nerve with a fragment of a bottle; sensibility of the palmar surface of the fingers by the nerve has completely disappeared, the muscles of the thenar prominence are paralyzed, and opposition of the thumb impossible; the short abductor, the opponens, and the short flexor are inert. Suture of the nerve is performed; the wound heals without difficulty, and little by little sensibility and movement return. In fact, at the end of two months and a half the patient can already execute opposing movements; the muscles of the thenar eminence contract under the influence of the will; and four months later the use of the hand is easy enough. Finally, eighteen months after the operation, Chrétien again saw the patient; the thenar muscles can be nicely felt when they contract: there is no appearance of atrophy, and Prof. Beaunis, with the help of the most precise methods of physiology, establishes that sensibility and movement are about the same on the wounded as on the healthy side, and in this case it could not be put down to the anastomosis of the ulnar and the median, for besides that, immediately after the section, paralysis of the opposing muscles was well marked. it was observed that, when the movements were re-established, excitation of the median above the cicatrix produced contraction of the muscular mass. Moreover, we must be allowed to think that the motor current followed the normal path of the median nerve, and Chrétien seems to us correct in concluding "that union by suture of the two ends of a divided nerve, may even in man lead to the re-establishment of the motor and sensitive functions of the nerve."

The essay of Marciquez furnishes us with a dozen analogous obser-

vations. Cure has not always been so complete, but the patients have often been older, the separation of the ends much greater, or the section of the nerve very high up, leaving a very extensive lower segment requiring a longer time for regeneration. In general, at the fifth or sixth month, under the most favorable conditions, movement has reappeared in the atrophied and paralyzed muscles. There is nothing in it abnormal. and, we repeat, the facts accord with our physiological knowledge of the regeneration of nerves.

Of the second group, or "paradoxical" cases, two facts of Tillaux may be cited as characteristic: A young girl, *æt.* 23 years, cut her median nerve; four months after the wound it is proved that there is insensibility of the palmar surface of the thumb, the index and the middle finger, of a part of the palm, and of the dorsal surface of the last phalanges of the index and middle fingers; anæsthesia is less marked, although very manifest on the external half of the ring finger. The muscles of the thenar eminence are atrophied, and the opposing movements of the thumb are abolished; trophic lesions exist on the middle and index fingers. The patient urgently entreated operation; the two ends of the median were exposed, and were distant from each other about 1 centimetre; the central end was swollen, while the peripheral was tapering. They were cleansed, and with a needle threaded with Florence gut, brought together and exactly adjusted; the thread was cut close to the knot and left in the wound. The most minute antiseptic precautions were taken, and the hand kept immovable. From the second day the patient complained of tingling on the palmar surface of the index and middle finger; on the third she perceived the contact of a pin, and even improvement in the movements. Six weeks after the intervention, movement and sensibility had so far returned that she could work at crochet and with the needle.

The second operation, performed on a woman *æt.* 28 years, is, so to speak, exactly superposable on the first, the only notable difference being that the section of the median dated from fourteen years before. But in the two cases the same impotence is observed, and the same appearances are found in the two ends; the revivifying and the suture were performed in the same manner, and the result in both cases was



identical. From the next day the fingers became sensitive and mobility reappeared. Moreover, in the second as in the first, the results were not ephemeral. Since leaving the hospital the two patients have not only retained the benefits of the surgical interference, but have seen them increase.

These two cases are not isolated. Three years before Tillaux' communication, Kraussold, then Th. Kölliker, then Boegehold, then Tillmanns, had published observations on suture, the first of all the nerves of the wrist, the second of the median and ulnar, the third of the radial, and the last of the ulnar. On the 2d day, the 8th, the 14th, and the 28th, they respectively saw return of sensibility and mobility. In a recent case of Polaillon, sensation manifested itself at the fifth hour.

The observation of Segond, where the disappearance of anæsthesia was immediate, has already been referred to. It will be seen that cases of almost immediate functional recovery are already very frequent.

These facts clash with what is known concerning the regeneration of nerves. Whether the suture has been primary or secondary, the immediate or rapid reappearance of sensation and motion cannot be explained. When the suture is primary, *i. e.*, performed a few hours after the wound, in any case before the end of the fourth or fifth day—the time when the axis-cylinders of the peripheral end are already destroyed—the return of the functions would necessitate the immediate union of the two segments. This immediate union has been well observed, but to this hour physiologists affirm that only the fibrous elements of the nerve-cord then adhere; the axis-cylinder, the essential agent of conductivity never joins directly to another cut axis-cylinder and the continuity of the nerve can only be re-established by the slow and complicated mechanism of degeneration, such as we have already described.

Immediate union, anatomically and functionally established, by newly formed nervous elements interposed between the still living two segments of the divided nerve, has been affirmed by Gluck and by Bakowiecki, but their experiments have appeared less than decisive to

Hehn, Falkenheim, Johnson, Ranvier and Vulpian. This immediate union, not only questioned but also rejected, should it be admitted, would only explain a very few of the cases of nerve suture in man. Since in the thirty-nine cases of primary suture, abstracted by Chaput, there are only four of immediate re-union. Moreover, Chaput only considered them as probable, whilst in twenty-seven secondary sutures, there were seven "certain" immediate unions.

Successes of secondary suture—of the two ends separately cicatrized—are still more paradoxical than after primary suture.

Because, however, the explanation of a fact is wanting, the fact itself is not invalidated. The rapid or immediate re-establishment of nerve functions has been observed too often, and by surgeons of too much weight, to question it. For practitioners the rule of conduct is quite settled that, when a nerve has been divided its two ends must be approached and maintained in contact by a delicate suture of catgut or Florence gut. Every precaution must be taken to avoid suppuration, since it promotes the formation of fibrous tissue and nodular masses, which compress the cicatrix and affect the functions of the nerve.

A certain number of cases have been reported in which nerve suture having appeared to give a negative result, a fresh incision has been made in order to revivify it and to attempt a more fortunate union, and in which it has been found after disengaging the nerve trunk from the surrounding fibrous tissue, that the continuity of the nerve has been perfect. No further interference being done, by degrees the functions have been observed to reappear. Ehrmann described a very clear case to the Société de Chirurgie. A cut radial was sutured seven months after the accident. Paralysis persisted; seven months later the nerve was laid bare, the nodular tissue excised, and it was ascertained that the continuity of the nerve trunk was established. At the end of a few days mobility returned in the paralyzed muscles.

The first practical conclusion reached by the author is that in cases of divided nerve-trunks primary suture should be done, and if it fail that a secondary operation be done, which will have a great chance of being followed by success. If the loss of substance of the nerve is so

great that the two segments cannot be brought into apposition by altering the position of limb, or by traction on the threads, "suture at a distance" must be performed, which as the experiments of Assaky have shown, diminishes the interval which separates the two ends of the divided nerve. By this means, at least in animals, the nervous cicatrix developed along the threads of suture, is richer in nerve fibres of new formation than when we abandon the cure solely to nature.

P. S. ABRAHAM.

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#### HEATH ON CERTAIN DISEASES OF THE JAWS.<sup>1</sup>

Mr. Heath's lectures bear the impress of the many years of study and the careful clinical observation which he has directed to this department of surgery. The subject matter had already been published in a more extended manner in his well-known work on *Injuries and Diseases of the Jaws* (London, 1884); nevertheless, the concise and readable form in which he has embodied it in his lectures will be welcomed by many who are unfamiliar with the larger treatise; and to those who were privileged to hear them the lectures were rendered extremely interesting and instructive by the large number of specimens with which they were illustrated. These comprised not only specimens from the large and complete series in the Royal College of Surgeons' Museum, but in addition many valuable and unique specimens culled from the museums of most of the London hospitals. Mr. Heath commences with a description of the anatomy of the antrum and of the diseases implicating that cavity. He gives rules for diagnosis between suppuration in the antrum and ozeona—sometimes confounded. In suppuration in the antrum there is occasional purulent discharge determined by position of the head, an offensive smell perceptible only to the patient and not to his friends, together with dull aching and often neuralgic pain. The neuralgia sometimes takes the

<sup>1</sup>Lectures on Certain Diseases of the Jaws. Delivered at the Royal College of Surgeons of England, June, 1887. By CHRISTOPHER HEATH, F. R. C. S., Hunterian, Professor of Surgery and Pathology. *Brit. Med. Jour.*, June 11 to July 16, 1887.

form of frontal headache and may lead the surgeon to suppose that the discharge comes from the frontal sinus. The lecturer had twice been consulted in such cases, in which "enterprising surgeons had proposed to trephine the frontal sinus." Distention of the antrum is quite an exceptional symptom of suppuration within it. Drainage by puncture above the alveolus is recommended for various reasons in preference to making an opening through the socket of a tooth, except when a tooth obviously requires extraction. The antrum may be distended by accumulation of inspissated pus and all the symptoms of solid tumour simulated. The particulars of such a case are given, an opening being made into the antrum in the belief that a solid tumour existed. Cases of so-called *hydrops antri* are probably referable to cysts originating in the antrum or its walls; these fill up the cavity and even distend its walls. In addition to other evidence supporting this view, the fact is of importance that the contained fluid is serous and frequently contains cholesterine instead of resembling mucus, as would be the case if it were simply a secretion of its lining membrane. The description of *cysts in connection with the teeth* is, perhaps, not free from some slight ambiguity. Mr. Heath classifies them as :

"First, cysts connected with the roots of fully developed teeth; and, secondly, cysts connected with imperfectly developed teeth, to which the term *dentigerous cyst* has been applied in modern times."

Upon this interesting point in the pathology of the jaws much has been written, prolonged controversy has been maintained in recent years by French pathologists, and much confusion has prevailed. The confusion has been in some measure due to the non-appreciation of the epithelial nature of the multilocular cystic disease of the jaws, this affection in its early stage being confounded with cysts more immediately connected, with tooth follicles or the roots of teeth. We recognize two distinct varieties of cysts directly connected with the roots of teeth. First, the inflammatory cysts found in connection with the fangs of permanent teeth after extraction, of which Mr. Heath gives some figures; they are, probably, formed by the exudation of serous or sero-purulent fluid beneath the peri-odontal membrane, and their walls consist of granulation tissue. Their origin is purely inflammatory.

Secondly, the recent researches of Malassez have placed beyond doubt the fact that some simple cysts, directly connected with the fangs of teeth, possess a lining of epithelium. They originate in epithelial remains which may be found around the neck and fangs of all teeth and termed by Malassez "epithelium paradentaire."

Of cysts originating in rudimentary tooth follicles or connected with the fangs of teeth, are: First, cysts probably originating by dilatation of the rudimentary enamel organ, of which a probable example described by Mr. F. Eve is referred to by Mr. Heath. Secondly, the dentigerous cysts or secondary cysts of Magitôt. We may also add that cysts probably occur in the jaws altogether comparable in their origin and structure to the dermoid cysts of the integuments, and, again, the cysts containing large numbers of ill-formed dentary bodies may, perhaps, be more correctly considered as teratomata than merely the result of malformation of a simple tooth follicle or, in other words, a dentigerous cyst. Some of the cysts projecting into the antrum may have a similar nature, for among the cases of antral cysts quoted is one recorded by Maissonneuve, in which pressure upon the chest produced a flow of butter-like fluid from the nose.

In speaking of the difficulties of diagnosis of dentigerous cysts the lecturer insists on the advisability of making an exploratory puncture through the mouth in all cases of doubt, stating that the diagnosis of cysts in which the "parchment-like cracking" is absent and some solid tumours is otherwise impossible. His experience of cases of multilocular cystic epithelial disease leads him to agree with the views put forward by Mr. F. Eve, that the disease is essentially malignant, though often in a low degree. It may be considered a peculiar form of epithelioma, the degeneration of the cells leading to the cyst formation being similar to that by which the central cells of the animal organ are destroyed. Two cases of this disease are quoted in which recurrence took place. In one the later recurrent growths were in great part sarcomatous; the other is more interesting in that the primary growth and the first recurrence were purely cystic and were treated simply by gouging, while the second recurrence formed a tumour which sprouted through the chin. Immunity followed excision of the affected portion of the bone.



The second lecture is devoted to a very full consideration of solid tumors of the jaws. We venture to suspect that many of the cases included under the heading of fibroma of the lower jaw were really instances of fibro-sarcoma or spindle-celled sarcoma, and this on both pathological and clinical grounds. We do not question the occurrence of fibroma of the jaws, although such tumours in other bones, except in animals, are almost unknown. Clinically the account of these tumours sounds very much much like malignancy, for we read. "The fibrous tumour grows slowly but surely, involving in its progress the surrounding structures," and again, "Simple fibrous tumours occasionally recur after removal, but it is doubtful whether in these cases the whole of the disease has been eradicated." Again, most of the cases cited occurred many years ago when the fibro-sarcomata were spoken of as fibrous tumors or recurrent fibroids.

An interesting case of a woman under the care of Mr. Liston is quoted in which a very large tumor of the kind under consideration was subject to monthly augmentations of vascularity and slight hæmorrhages after the menopause. The upper jaw may be involved in cartilaginous tumors springing from other bones of the face. In the lower jaw enchondromata occur primarily, both as endosteal and periosteal growths. The central or endosteal tumors may be treated by gouging, and two cases in which this operation was successfully performed, are quoted.

Under the head of osteoma an interesting case of hypertrophy of the jaw in a woman, æt. 25 years, is given. A painless enlargement of the right upper jaw had been noticed for ten years. The jaw was successfully removed, "and on section the tumour was found to be simple bone, very dense, but otherwise healthy." The case is noteworthy from the fact that very similar osseous tumours, causing a general enlargement of the whole upper jaw, have been described from their microscopic appearances as ossifying sarcomata. The jaws are a favorite seat of myeloid sarcoma, which usually occurs in persons under 25. The disease is central, expanding the walls of the bone (except when it takes the form of epulis) and may therefore be mistaken for a cyst. The case of a boy æt. 7 years, under the lecturer's care,



is related. There were symmetrically placed myeloid tumours at each angle of the lower jaw forming prominent projections. The main part of each projection was sawn off and the soft portion of the tumor was removed with the gouge. There appears to have been no tendency to recurrence. The jaws may be attacked both by squamous and columnar epithelioma; the former begins in the gums or palate; the latter in the upper jaw in the antrum. Epithelioma beginning in the tongue and lip may also involve the lower jaw. In regard to treatment it is pointed out that in the case of malignant disease of the lower jaw it is impossible to carry out the plan adopted in the case of other bone, namely, of amputating at the joint above the disease.

A brief notice is given of the now well-known disease of actinomycosis as affecting the jaws. A report by Mossbrugger on cases observed in the Tübingen clinique shows that of 11 cases the disease began in the lower jaw in 6; in the upper jaw in one, and in the cheek and lungs in the remaining 4 cases. Of 75 recorded cases in the human subject 29 were inoculated in the neighborhood of the lower jaw, floor of the mouth and throat and in 9 the upper jaw and cheek. Of the cases treated in the Tübingen clinique, all those involving the jaws, except one in the upper, recovered. The operative measures embraced incision and scraping with sharp spoons. The disease started as frequently around sound as carious teeth and always about a molar tooth. The earliest appearances are similar to those of a subperiosteal tumour and severe toothache is a common symptom.

The third lecture deals with disease of the temporo-maxillary articulation and closure of the jaws from various causes. It contains some original observations and some practical advice regarding the operative treatment for the cure of closures of the jaw. The lecturer remarks "that acute disease of the temporo-maxillary joint is hardly recorded," and thinks the explanation may be found in the fact that it is often confounded with acute affections of the ear. Perforation of the floor of the meatus may ensue, and the condyle may find its way into the meatus. He is of the opinion that many cases of "subluxation" are due not to slipping of the inter-articular cartilage but to rheumatic or gouty changes in the articulation, as shown by the history and by the results of treatment.

A full account is given of the curious deformity due to hypertrophy of the neck and condyle of the lower jaw, of which only three cases have been recorded. The condyle is much elongated, generally enlarged and somewhat the shape of an inverted pyramid. The chin is pushed forward and towards the opposite side to that on which the disease is situated. In one case the patient was affected with chronic rheumatism, but there was no history or evidence of arthritic disease in the other two cases.

In the case described by Mr. Heath he incised the enlarged condyle with good results. This fact is probably not generally recognized by surgeons that *spasmodic closure of the jaws* may be connected with the eruption of the wisdom teeth of the lower jaw, either from want of room or malposition of the wisdom tooth itself. The affection may be of several weeks, or even of years, duration.

In discussing the operative treatment of permanent closure of the jaws from cicatrices within the mouth or of the cheeks, the author strongly recommends division of the jaw in front of the cicatrix, and prefers Esmarch's operation in which a wedge-shaped portion of the bone is removed to that of Bizzoli, who only divides the bone from within the mouth. He concludes as follows: "In cases of fibrous ankylosis of the temporo-maxillary joint it may be worth while to try division of the adhesions, and, failing in that, to resect the condyle.

"In cases of bony ankylosis of the joint, division of the ramus of the jaw below the masseter seems to me the least dangerous and most satisfactory proceeding."

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#### CERTAIN POINTS IN CONNECTION WITH SYPHILIS.

*Prof. E. Lang*<sup>1</sup> (of Vienna) relates three cases in which gummatous lesions passed into cancer:

1. A man, æt. 40 years, presented several subcutaneous gummata, and at the same time a hard nodule in the floor of the mouth under the tongue. In spite of specific treatment the latter ulcerated, became papillomatous and finally assumed the character of a true epithelioma.

<sup>1</sup>*Wiener Med. Blätter*, 1886, Nos. 41 and 42.

2. In a man of about the same age, a gummatous ulcer of the lower lip healed under appropriate treatment, but a year later it again ulcerated, and excision proved it to be cancerous.

3. This case was less definite. In a syphilitic patient an epithelioma formed on the lower lip, but the evidence of a previous gumma was not forthcoming.

*M. Horwitz*<sup>1</sup> treats of the hæmorrhagic form of secondary syphilis, and holds that it indicates a mild course of the disease. Two cases are given.

*M. Bourdin*<sup>2</sup> (of Paris) points out that the following conditions may render an attack of syphilis unusually severe: (1). Chronic alcoholism. (2). Want, or physical depression from various causes. (3). Neglect of treatment in the early stages. 4. A very early or a very advanced age of the patient. 5. Certain diatheses, especially the scrofulous or tuberculous one. (6). Pregnancy. (7). Malaria. With regard to 4—the age of the patient—we have seen cases of syphilis acquired at the age of four and sixty years pass through the various stages without presenting anything unusual in the symptoms or their severity.

*M. Bidon*<sup>3</sup> (of Paris) describes under the term diffuse hypertrophic syphiloma, a tertiary infiltration affecting sometimes the mouth or other parts of the face, sometimes the genitals of either sex, and sometimes the rectum. The diagnosis is often mistaken during the early stage when active treatment would diminish the risk of the infiltration passing on into stricture, and therefore the affection is worthy of special note, although its pathology presents nothing exceptional from that of other tertiary syphilitic lesions. In a very marked case lately under our observation, the skin of the penis, the prepuce and even the glans were enormously thickened. The disease had been regarded as epithelioma, and considerable ulceration had occurred. Careful examination of the excised prepuce showed it to be infiltrated with round cells, and at one part a small gumma was present. Subsequent treatment with iodide of potassium led to complete subsidence of the remaining swelling.

<sup>1</sup>*Vierteljahrschrift f. Derm. und Syph.*, 1886, No. 3.

<sup>2</sup>*Thèse de Paris.*

<sup>3</sup>*Thèse de Paris.*

*M. Quédillac*<sup>1</sup> reports eight cases of jaundice occurring during the secondary stage of syphilis. The pathology of this now well-recognized symptom is still obscure; it may be due to an inflammation of the hepatic parenchyma allied to the renal affection which produces albuminuria during the secondary stage, or to catarrh of the biliary ducts. In favor of the latter view the writer states that occasionally biliary colic of a mild form occurs during its course. Mercurial treatment is followed by rapid improvement, and if it is omitted the jaundice tends to persist for a considerable time. It appears to be most commonly met with in hot climates.

*M. Saint-Avid*<sup>2</sup> believes that the non-infecting chancre of the uterus is more common than is generally believed, that it may be situated either on the os uteri or within its canal, and that it may be either of the follicular variety, the diphtheritic, or the ulcerating. Lymphangitis secondary to the chancre may lead to pelvic peritonitis. Successful inoculation of the secretion is the only test of the intra-uterine chancre, when chancre exist on the os and on the vaginal wall or vulva. *M. Quédillac* holds that the former is nearly always the primary one.

J. HUTCHINSON, JR.

<sup>1</sup>*Thèse de Paris.*

<sup>2</sup>*Thèse de Paris.*

## REVIEWS OF BOOKS.

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CURE RADICALE DES HERNIES. Par le Dr. JUST LUCAS-CHAMPIONNIERE, Chirurgien de l' Hôpital Tenon, etc. Paris: Adrian Delahaye et Emile Lecrosnier, 1887.

ON THE RADICAL CURE OF HERNIA. By Dr. JUST LUCAS-CHAMPIONNIERE, Surgeon to the Hospital Tenon, etc. Paris.

To Dr. Lucas-Championnière has been ascribed the merit of being "the introducer of antiseptic surgery into France." He has been and is certainly its most active and enthusiastic apostle in that country, which, although the birthplace of Pasteur, has been slow to adopt the methods of Lister.

For Lucas-Championnière there is but one method of radical cure for hernia, the principles of which are unvarying, though the practice is to be minutely adapted to the circumstances of each case. That method is excision of the sac and suture of its neck.

This teaching is "*thorough*." There is to be no hurry, no incompleteness, and this applies equally to the mechanical execution of the operation and to the preservation of strict antisepsis. The mere statement of this should be enough to win for Dr. Lucas-Championnière and his teaching the sympathy of every surgeon of experience in the cure of hernia by excision of the sac. Truly, in this operation half measures are an utter delusion. The surgeon who, finding difficult the separation of the sac from its surroundings or from its contents, gives up the attempt, generally gives up the chance of securing a radical cure, and but trifles with the case by such proceedings as tying or sewing up a stump of omentum in the neck of the sac. Our author is very vigorous and clear on this point.

But in certain cases he would permit the operation to be divided into two parts, done on separate occasions. For example, in a case with an immense sac, he would not always dissect away and excise the whole sac at the same operation in which he cut it from its neck and tied the latter.

He considers that adhesion of omentum to the neck of the sac is a frequent cause of difficulty in retaining herniæ by a truss.

Unreduced testicles he regards as worse than useless and excises them remorselessly when associated with hernia. For their worthlessness he quotes Godart as his authority. But if, as our author emphatically states, an unreduced testicle is not only totally without sexual value, but also "a source of constant pain and a permanent menace of the return of the hernia," it is scarcely logical to require as a condition of its removal that the other testicle shall be healthy. This our author does, and suggests thereby that his conscience is not quite easy on the subject. For our part, we object to unrestrained castration and fail to see that the healthiness of the other testicle has anything to do with it. It is entirely a question of what the testicle to be removed is worth. Moreover, it should not be forgotten that a testicle has also a psychical value, so to speak.

Upon one occasion Dr. Lucas-Championnière, while operating for radical cure of hernia, wounded the vas deferens. He says: "I did not hesitate to practise castration simultaneously with the radical cure." He does not say exactly what he was doing when he wounded the vas deferens. Was he doing one of those extremely thorough and minute dissections of the sac which he recommends? Probably so. We also recommend the same, but recognize the obligation to point out that the procedure is surrounded by real dangers, especially to operators who affect "dash." We have seen a surgeon divide the vas deferens accidentally, and once had the misfortune to be assisted by a gentleman who fussily tore the vas deferens from all its connections for a distance of two inches before he could be stopped, thereby gravely imperilling both the vas and the testicle.

Occasionally, the difficulties of completely detaching the sac are very great. At his tenth operation, Lucas-Championnière says they were such that he would have been quite vanquished had it been his first and he, consequently, inexperienced.

He recommends the anæsthesia to be profound. Otherwise, the operator will be disturbed by impulse of the intestines or escape of blood. The minute dissection should be made while the parts are quiet and, after a fashion, bloodless.

In ligaturing the neck of the sac, and suturing the canal, Reverdin's needles are highly praised. These permit the eye of the needle (situated near its point) to be opened and shut by a slot moved by a button placed on the shank near the handle.

When the sac is very large, several ligatures are used, so passed



that they form a chain, each link of which both intertwines with its neighbor and pierces the sac. Illustrations are used to describe this.

The author regards the pillars of the inguinal canal as playing only a passive part, and their suture as only useful indirectly, even if useful at all.

What is to be desired, and, if necessary, buried sutures of catgut used to obtain it, is the fusion of raw surfaces and above all of the cellular tissue which joins all the parts together. Energetic compression (by the dressings) is strongly recommended in order to secure this.

He says that cicatrices formed without suppuration give a more perfect resistance than those formed after suppuration. The proofs furnished of this statement do not seem to us to be very strong, though we are inclined to believe that it is true.

Two interesting cases with large hernial apertures are described in which M. Lucas-Championniere transplanted skin to close up the apertures or help to do it. They appear to have been successful.

In one case a needle was broken and the point lost in the peritoneal cavity. The patient was seen some years afterwards quite well.

Our author prepares his own catgut.

Regarding the omentum as an active agent in the causation of hernia, he excises as much of it as possible. It is necessary to tie the knots very carefully in ligaturing omentum, as, the stump having to be passed back into the abdomen through a very narrow orifice, the ligatures are in danger of being rubbed out of place in the passage. When dealing with a mass of omentum, he divides it into several separate parts and ties each independently, not interlocking the ligatures into one chain, as he does when tying the neck of the sac. The result is that the omental stump does not form a great mass, difficult to return into the abdomen, but goes back easily and spreads itself out when returned.

With regard to drainage tubes they should only be superficial, and are not necessary in dealing with umbilical hernia, just as they are not necessary after ovariectomy.

We are inclined to take exception to this teaching. We believe that it is a mistake not to drain the superficial parts of some deep wounds. We have seen, for want of it, suppuration between the layers of the abdominal wall after an ovariectomy, between the aponeurosis and the skin after suture of the patella and other analogous accidents, which though perhaps not serious in themselves, have both alarmed and confused the surgeon.

He brings out the drainage tubes as far away from the genitalia as possible.

In order to do this, the reviewer has sometimes made a special opening for the tube and completely closed the original wound. This plan is to be particularly recommended after operating on large femoral herniæ in fat women with a deep sulcus at the groin.

In the chapter on "Dressing and Antisepsis" are made the following remarks, well worthy of consideration: "The operation presents numerous perils for antisepsis. The locality, the mobility of the dressing, the movements of the patient which tend to displace it, the uncleanliness or rather the habitual septicity of the region form serious obstacles to surmount. There may even be added to these difficulties what seems paradoxical, the simplicity and success of a large number of operations for strangulated hernia. In fact, as, after operation for strangulated hernia, the operation wound presents but a small surface, whilst the discharge is very moderate in quantity, repair takes place very satisfactorily or nearly so. Therefore, the surgeon concludes that the array of antiseptic precautions recommended to him is useless, he proceeds more quickly, more brilliantly, cures the three first patients operated on, loses the fourth and declares that the operation is dangerous in itself, for in truth he does not know why the last patient has perished and the other three survived. It is not the operation, it is *he* who is dangerous from confidence in imperfect procedures against which we have vainly sought to forewarn him."

This is exceedingly plausible, but the admissions of the real difficulties of applying antiseptic surgery in this operation contained in the beginning of the above quotation refute the assertion made at the end. What M. Lucas-Championniere states as *the* cause, the sole cause of failure, is only one of several, perhaps many, though we admit it is a very important one. The patient has not only to be carefully guarded against germs, but he has to be protected against himself, and, in the present state of education as regards the question, only too often against his dresser, his house surgeon and his nurse. No one could possibly be more careful than the writer of this review has always been about making his dressings "snug" and securing them in place, by the free use of rubber bandages and of strapping; and yet I one day found one of my hernia cases with his hands thrust beneath his dressings as if they were his breeches' pockets. This would have mattered nothing had he merely been operated on by injection. It is for practical purposes, perfectly idle to speak of an operation as if it were an abstract affair. One calls to mind a comparison of Ruskin's, and is reminded of a system of gymnastics based on the supposition that human beings have no skeletons and recommending men to roll them-

selves up into balls, tie themselves into knots, etc. But human beings *have* skeletons, and all the persons concerned in an operation for radical cure of hernia, patient, surgeons, assistants, nurse, each and all have frailties, are liable to forget, to mistake, to overlook, to overdo. Therefore, such an operation as that which M. Lucas-Championniere deals with, and of which in his book he only records ten observations of his own, must be dangerous in proportion as it is long, elaborate, complicated and tedious, requiring many instruments—animate and inanimate.

Returning to operative details, the site of operation is, as a preliminary, washed with "eau de Panama (decoction of *Quillaya saponaria*).” It is then washed with soap and a 1-20 carbolic lotion, and shaved carefully. After the shaving, it is rewashed with the 1-20 carbolic, and lastly covered with compresses soaked in 1-40, whilst the patient is being chloroformed.

The spray is used, and strong preference expressed for a producer made by Collin, of which the spray is extremely divided. The principle on which Lucas-Championniere uses the spray for these operations is that of using it for all cases in which a cavity is opened whose inmost recesses are inaccessible (during the operation in question).

Importance is attached to the association of several antiseptics. He washes the wound with both carbolic and sublimate lotions.

He sometimes uses "protective.” In these regions where the wound can never be far from one edge of the dressings, is not protective objectionable from its directing any discharge towards the edges? For this reason the reviewer prefers iodoform gauze which answers every purpose and is more easily removed than sublimate or carbolic or glass-wool, because it is softer and more prone to absorb lotions.

Our author bandages a wet sponge over the first dressings, which are very composite, containing about seven different antiseptics. He covers all with a mackintosh. Our objection to this complicated dressing is that it is surely not necessary either for obtaining antiseptis or elastic support. All the details of dressings are described and rules for changing given very minutely. They are excellent but might be a little simpler.

M. Lucas-Championniere often places an inverted basin or a pile of books beneath the sacrum while bandaging.

With regard to the state of the parts some period after the operation he notes at first that the hernial canal is distended by a kind of "stopper" (*bouchon*), which afterwards dwindles to a fibrous cord, the canal itself contracting with it.

He recommends after the operation that a truss be worn, and especially a truss with a pad made to control the whole site of the operation. An illustration is used to describe this.

For our part, we believe that the point to be seen to is not the shape of the truss but its fit. We should be a little unhappy if we thought it essential to always send to M. Collin for spray-producers and to M. Rainal for trusses.

The book concludes with detailed accounts of ten operations by the author, of which nine were successful and found to remain so for periods varying up to as long as five years in one case. "No accidents were observed in any of the cases."

Our notice, broken up as it were, into fragments, conveys no idea of the completeness and finish of this excellent book. The young surgeon ambitious to commence the practice of the operation described, will not find in any language a safer or more useful guide. This notice must have demonstrated that it contains much to interest surgeons whose experience equals or exceeds that of M. Lucas-Championniere. And, throughout, the book is remarkable for its calm and judicial tone. The thoroughness and antiseptic enthusiasm which pervades every page never tempts our author into the slightest wilful exaggeration. After the fashion of the best French works, everything stated is given with precision and in due order. The form and arrangement of the monograph fit it to serve as a model.

C. B. KEETLEY.

L'AMPUTATION DU MEMBRE SUPERIEURE DANS LA CONTIGUITE DU TRONC. (L'AMPUTATION INTERSCAPULO-THORACIQUE). Par PAUL BERGER, Chirurgien l'Hôpital Tenon, Professor Agrégé a la Faculté de Médecine, Membre de la Société de Chirurgie. G. Masson: Paris, 1887.

INTERSCAPULO-THORACIC AMPUTATION OF THE UPPER EXTREMITY. By PAUL BERGER. Paris: 1887.

This work is based on the author's paper last year before the French Surgical Congress (v. ANNALS, 1887, April, pp. 346-8). The operation in question consists of total ablation of scapula and arm. resp. in some cases of whatever was left by previous amputation or accidental mutilation. This also ordinarily involves removal of the external or even greater part of the clavicle. It is not exactly either an amputation or a disarticulation, and has no counterpart on the lower extremity. Although repeatedly practised it does not seem to have any recognized position as an operation.

Since Cheselden's work in the last century it has been known that

recovery might occur after accidental loss of these parts, yet the operation is a modern one. Cuming in 1808 is credited with having first performed it—for an accident in war. The earliest cases of such ablation for removal of tumors were by Americans in the thirties.

Previous collections of cases have been utilized together with recent scattered and two new cases, one communicated to him by Ollier and the other from his own service at the Charité. These to the number of 51 are given with all available details. Then follow special chapters on the results, indications and execution. He divides the cases into three classes, (1) total primary amputation for pathological causes—22 cases; (2) consecutive amputation (*i. e.*, exsection of the scapula subsequent to disarticulation at the shoulder) for like causes—16 cases; (3) amputation for injury—13 cases.

The results, immediate and subsequent, are given for each class. The mortality in class I was five, death following the operation in from a few minutes to six days. In one of these, however, the operation also included removal of a mammary cancer and resection of the thorax wall this making a large opening into the pleural cavity. Hence he puts the deaths attributed alone to the operation in question at 4 in 21 (19.05%). Amongst the 16 cases in class II there were 3 deaths, thus giving the same numerical ratio as in class I. This is an exception to the general rule that a reamputation is less serious than primary amputation at the same joint. Under class III there were 4 deaths, almost a third. Here concomitant lesions necessarily lower the chances of recovery. Against the possible criticism that favorable cases might be oftener published than failures, he points out that the 4 cases in the Paris hospitals all recovered and from this argues that the mortality given above can probably be reduced.

The deaths under class I—besides the case already mentioned—were twice due to shock, one being that of a child *æt.* 2 years—once to hæmorrhage and once to sepsis. The 3 deaths in the second class were owing to exhaustion, shock and septic infection. Of the traumatic cases 2 died from their extensive injuries. This leaves a mortality from the operation itself of 2 (1 from sepsis and 1 from exhaustion) in 11 or a little less than one-fifth. This, on comparing with the previous classes, he believes the average mortality.

Amongst the accidents from the operation we should expect the frequent occurrence of hæmorrhage, in view of the numerous and large vessels especially in cases of hæmorrhage. Yet the loss of blood was rarely great. In only two cases did it contribute to a fatal result, though in 2 others it was considerable.



Entrance of air into veins occurred certainly in 4 cases. Death followed in one case though not directly therefrom. One of these 4 operations was for an accident. In 3 cases the air entered through an opening in the subclavian vein, in 1 through the axillary vein. By previous ligation of the subclavian vein and due regard to the possibility of this accident danger from this source can be guarded against.

The last of the immediate complications is operative shock. In accident cases it is impossible to estimate the share of the operation in this. Here it might be desirable to wait until the traumatic shock had subsided, whenever possible.

Many of the recorded later complications such as inflammation, supuration, septicæmia, gangrene, etc., were due to preventable septic infection. In several cases fistula has persisted for months. He concludes that the operation is not very frequently attended by accidents, and more rarely followed by complications.

When the operation has been performed for malignant growths there has been a large proportion of relapses. Here again the division into primary and secondary operations is used. Of 22 pathological primary operations, 17 survived for a longer or shorter period. One was for osteomyelitis and gave a permanent recovery. There remain 16 for diverse tumors. In 9, relapses occurred in from one month to four years. In only 3 of the remaining 7 was the result known to have been lasting.

Secondary operations for morbid processes do not show better results as regards relapses. In 13 of 16 cases the operation was survived, one of these was for ostitis. Of the 12 for tumors, 5 were followed by relapse, and in several others the later course was unknown. In a couple of cases the cure seems to have finally been permanent.

The resulting deformity varies somewhat according as the clavicle is or is not resected. When removed, the remaining parts have but a limited mobility and consequently slight tendency to ulcerate. Where the collar bone is preserved entire the form is better but there is more tendency to mechanical injury at its outer point, hence its removal is to be preferred. In 2 cases—1 recovering—a portion of the acromium was left with the clavicle. In some cases an incurvation of the vertebral column on the side of the removed member has developed. Prosthetic apparatus tends to counteract this besides masking the mutilation and partially replacing the usefulness of the lost extremity. He figures a form of chest corset passing over the shoulders and strapped around the remaining arm, the whole bearing an artificial substitute for the parts lost.



pathological indications for the operation are osteomyelitis, white swelling of the shoulder joint, malignant tumors and in exceptional cases aneurysms inaccessible to other means of treatment. Of the 20 cases for tumors, in 9 the primary seat was in the scapula, in 6 at the upper end of the humerus, whilst in 5 it was not given. In large tumors of the scapula the operations to be considered are resection, total removal, and amputation of arm and shoulder. The latter shows slightly less relapses than total removal of the bone; resection has less mortality but more relapses. Resection with preservation of the arm should be preferred wherever practicable, but is counter-indicated where the axillary vessels or the joint and upper part of the arm are involved, at times where the tumor is of great size, where the skin is considerably involved or ulcerated or the axillary glands are already infiltrated. An exploratory incision is hardly advisable, as, if the major operation is to be done, the vessels should first be ligated. Counter-indications to the interscapulo-thoracic amputation are the same as in all malignant tumors—inability to remove all that is diseased. This operation for tumors of the humerus he justifies where simple amputation would be insufficient.

Of the 13 cases for traumatism, 2 were for shot wounds, 4 for maiming by machinery, 6 for tearing off of the limb and 1 uncertain. His method of operating has already been described in the *ANNALS*. Various modifications of other surgeons are also included.

A general bibliography of the subject is appended, besides additional references in the text as the literature bearing on this question is included under that of operations in general on the scapula. Scattered through the body of the work are several illustrations, and at the end are two lithographs of the applied surgical anatomy.

WM. BROWNING.

MANUAL PRACTICO DE CIRURGIA ANTISEPTICA. Par el Dr. CARDENAL, Director del Hóspital de Utra. Sra, del Sagrado Corazon de Jesus, etc. Segunda Edición. Con grabados intercalados y láminas aparte cromolithografiadas. Barcelona: Espasa y Ca, 1887.

PRACTICAL HANDBOOK OF ANTISEPTIC SURGERY. By Dr. CARDENAL. Second edition. Illustrated.

ANLEITUNG ZUR WUNDBEHANDLUNG. Von Dr. MAXIMILIAN SCHAECHTER, Operateur der 1. Chir. Universitätsklinik zu Budapest. Wiesbaden. J. F. Bergmann, 1887.

GUIDE TO THE TREATMENT OF WOUNDS. By Dr. M. SCHAECHTER, Operator in the University Clinic of Budapest.

The work of Dr. Cardenal is a large, attractive, profusely illustrated, finely printed work of over 700 pages. It is put into the form of lectures, and therefore is didactic and elementary in its scope, but is at the same time comprehensive and thorough in the way in which it presents the antiseptic idea and practice of the present day. Almost every page presents references to English, French, German or American authorities, and it is evident that the author, with great judgment and discrimination, has made use of every source of information of any value upon which to draw for the purpose of presenting to his compatriots an adequate statement of his subject. His style is clear, his conclusions are plainly stated, being wonderfully free from verbiage and obscurity of diction. The work is systematic in its plan; it begins with a discussion of the pathology and therapeutics of inflammation. His definition of this apparently undefinable condition is that it is *"a disorder of nutrition in living tissues, produced by the penetration into them of a markedly deleterious substance from without, which declares itself by the temporary exaggeration of the nutritive processes, with a tendency to the formation of excessive exudates and to their transformation into pus."*

Of course these "markedly deleterious substances from without" which are the essential cause of destructive inflammation are micro-organisms, and their entrance into the tissues is described by the term "infection." This is the corner-stone of the antiseptic fabric. The reasons for such a doctrine are clearly and well given by the author in his first chapters.

The next chapters deal with wounds in general, both subcutaneous and open, together with the subjects of shock, septicæmia and pyæmia. This leads to the therapeutics of wounds, and the discussion of the place in wound-treatment of rest, drainage and antiseptics, with a review of the results of antiseptic methods. Next, in the seventh lecture, antiseptic apparatus and materials are described. The practice of antiseptics in surgical operations, and in the treatment of accidental traumatisms, the treatment of the complications of surgical and accidental traumatisms, the treatment of common and specific, acute and chronic inflammatory affections, occupy successive lectures. Then follows a lecture on modifications and innovations introduced by antiseptics into the principal surgical operations. A short lecture describing various modifications of the strict antiseptic method concludes the volume proper, but an appendix is added devoted to a description of the method and processes of bacterial technology.

Our examination of this book has given us great pleasure. It is ev-

idently the work of a surgeon who combines a talent for industry and research, with practical experience and enthusiasm, and a clear conception of what kind of knowledge is required by one who would be abreast of the surgery of to-day. It puts at the command of Spanish-speaking surgeons the whole literature of the subject of antiseptic surgery.

As yet we have no work in the English language which can compare with it in its peculiar field.

Dr. SCHAECHTER'S work is a book of about 340 pages, closely printed, without an illustration, minutely systematic in its plan, and thorough and exhaustive in its treatment of all matters connected with the present status of wound-treatment. The copy before us is a German edition of a work written also in the Hungarian language; the author is connected with the surgical clinic of the Hungarian University at Budapest, and acknowledges Prof. von Kovás, of that University as the inspirer and director of his work. What Dr. Cardenal has done for his compatriots in Spain by his work, Dr. Schaechter has also done for his Hungarian colleagues. Both of these works serve as witnesses to the positive and enduring character of the changes which surgery has witnessed within recent years in its knowledge of the pathology and treatment of wounds. They are not reports of progress, nor argumentative exhibits, nor masses of clinical reports, but are thorough and comprehensive statements of settled facts. The antiseptic doctrine and practice has emerged from the period of experiment and argument, and is now an established canon of surgery.

Schaechter divides his book into five parts; in the first he treats of wound-healing and its disturbances; in the second, of the conditions of wound-healing and the indications for treatment; in the third, of antiseptics and of the materials and methods of antiseptic wound-treatment; in the fourth, of special wounds; in the fifth, he describes the methods of antiseptic practice adopted in the surgical clinic of the university at Budapest. Some general reflections upon the subject of antiseptic wound-treatment conclude the volume. Here he shows a philosophical and broad spirit. The particular antiseptic, he says, is not of so much importance, but the manner in which it is used is everything; the hæmostasis, the coaptation of the wound-surfaces, the drainage and the application of the dressing, these play the greatest part in determining the result. The recognition of this is the key by which good results may be obtained with varying means. The nearer we can obtain cleanliness without the use of chemical agents, the

nearer are we to the ideal wound-treatment, which is *perfect asepsis without antiseptics*.

The book as a whole is of great value, especially from the completeness with which it presents all the various agents and methods which are available to the surgeon in efforts to prevent or overcome sepsis.

L. S. PILCHER.

DIE KRANKHEITEN DER AUSSEREN WEIBLICHEN GENITALIEN UND DIE DAMMRISSE. Von Prof. Dr. PAUL ZWEIFEL. Lieferung 61, Deutsche Chirurgie: herausgegeben von Prof. Dr. Billroth, und Prof. Dr. Luecke. Stuttgart: Ferdinand Enke. 1886.

THE DISEASES OF THE EXTERNAL FEMALE GENITALS, AND LACERATIONS OF THE PERINEUM. By Dr. PAUL ZWEIFEL, Professor at Erlangen.

Like some of its predecessors reviewed in these columns, from time to time, this installment of the colossal work on German surgery edited by Profs. Billroth and Luecke gives abundant internal evidence of the nationality of its author.

Dr. Zweifel has the true German love for minuteness, and he crawls over his subject with indefatigable industry. No doubt, in a work of reference, such as the entire compilation is intended for, this laboriousness has its justification; but even in this regard there is good ground for criticism in the part before us in the scanty references to American gynecology, compared with German or even English.

In assigning the subject matter of this treatise the editors have followed the ordinary course of most writers on gynecology; but the divisions chosen are so entirely arbitrary, having no logical justification pathologically, that the result is necessarily somewhat unsatisfactory.

For instance, what could be more artificial than to treat inflammatory conditions of the vulva in one book, those of the vagina in another, while those of the uterus and tubes are considered in a third.

We urge this not in fault-finding with Dr. Zweifel, who, of course, has his province assigned him, but because it suggests a defect in a great deal of our current medical literature, namely, the writing up of one little area in the body almost regardless of its relations to the other portions.

Turning now to the book itself, the two opening chapters on development and malformations are among the best in the book; the author briefly summarizes the most remarkable cases on record, and

his industry in collecting them is worthy of all praise. His practical conclusion that surgery offers the only remedy will be endorsed by all; in this direction it is to be regretted that he has overlooked the interesting case reported in the American Gynecological Transactions by Dr. Campbell, of Georgia.

The third and fourth chapters on Hernia and Injuries of the Vulva are somewhat unsatisfactory.

The fifth chapter deals with inflammation and is fairly satisfactory, though no mention is made of Skene's duct of the urethra acting like the glands of Bartholin as lurking places of infection.

The following chapters on Oedema and Gangrene, on Exanthemata, on Parasites and Herpes, though somewhat spun out, fairly summarize existing knowledge.

The tenth chapter on tumors of the vulva is unusually good, and so is the eleventh on diseases of the ducts of Bartholin.

The twelfth chapter on lacerations of the perineum and their repair is the most important in the volume.

In the analysis of the different forms of laceration, no mention is made of those cases in which there is subcutaneous or submucous separation of the muscles without any external lesion. The account of the ætiology and nature of the different degrees of laceration is fairly well done, less so the therapeutics.

Americans have just reason to complain that all mention of Emmet's work is wanting. Our author goes into a detailed account of the methods employed by the leading German operators in passing their stitches. Some of these are so complex, especially Freund's, that they are largely unintelligible. We cannot congratulate the author on having lessened the confusion already existing on the subject of perineorrhaphy.

The thirteenth chapter, dealing with vaginismus, is good; but no mention is made of the value of cocaine in its treatment.

The two final chapters on Pruritus Vulvæ and Coccygodynia call for no special comment. The book as a whole is a fair sample of the work of the typical industrious German compiler. Its author is a learned man and is proud of showing it; he has not yet learned, as Carlyle pointed out, that the value of any literary structure is not to be measured so much by what shows on the surface as by what goes into the foundation, where it is not seen.

W. M. THALLON.



A REVIEW OF SOME FACTS CONNECTED WITH  
GUNSHOT WOUNDS OF THE ABDOMEN,  
AND PRACTICAL DEDUCTIONS  
THEREFROM.<sup>1</sup>

By CHARLES T. PARKES, M. D.,

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PROFESSOR OF ANATOMY IN RUSH MEDICAL COLLEGE.

THE object of this contribution to the subject of gunshot wounds of the abdomen is to pass in review such facts as are at our disposal in its consideration, to make such deductions from these as their limited number will afford, and to offer some suggestions based on personal experience.

Probably no question submitted to the consideration of surgeons has ever arrested the attention of the profession more promptly than the general question of surgical interference in penetrating gunshot wounds of the abdominal cavity, and it is at once remarkable, and to the honor of the profession, that the obvious deductions have been as promptly applied.

Up to 1885 the whole number of recorded operations for gunshot wounds of the abdomen that I have been able to find is six; by this is meant cases in which the surgeon has deliberately sought out the wounded intestines, and repaired the damage inflicted, in accordance with surgical principles.

Surely, a small number in view of the wars which have gone by, contributing and bringing under the surgeon's care, great numbers of these injuries under consideration, and the many individuals shot through the abdomen in brawls of civil life, also placed under medical supervision.

Up to 1885 the profession had not looked the real question square in the face; surgeons held uncertain opinions, with the

<sup>1</sup>Read before the Surgical Section of the Ninth International Congress, September 5, 1887.



large majority opposed to any interference whatever, and, as might be expected under such complicating conditions, the results were not brilliant. Operations previous to three years ago were the exception. The magnitude and importance of the subject seemed not to be realized.

Now, I would venture the assertion that there are few modern surgeons who, confronted with a bullet wound of the abdominal walls and not able to convince themselves that the ball had not effected a penetration, but would explore the cavity.

When in the winter of 1884 I reflected on the necessity of systematically and experimentally studying this subject, I did not anticipate that in so short a time such radical change would take place in the method of treating such cases, which, previously had been relegated to cure by opium, rest and hopes in Providence.

The results of my observations were published in the *Journal of the American Medical Association*, in 1885; they were the observations and outgrowing deductions from a series of experiments systematically carried out during the previous winter for the purpose of throwing light upon the pathology and treatment of these injuries, and of recording the clinical facts attending shot wounds of these organs.

Since the publication of my address to the American Medical Association in 1885, thirty-six cases of operative interference in gunshot wounds of the abdomen have been recorded, with nine recoveries following opening the abdomen, suturing the wounded intestines and treating other complicating injuries.

Sir William MacCormac in the Annual Oration delivered by him May 2, 1887, before the Medical Society of London, has collected from all sources thirty cases. To these must be added one case reported by Prof. McGraw, of Detroit, of double perforation of the ascending colon, exposed by enlarging the surface wound, and suturing the intestinal perforations; recovery following. Another, by Dr. J. B. Murphy, of Chicago, of shot wound of the liver, in which the abdomen was opened, blood clots removed, and the wounds sutured; recovery following. Also a death, reported by Dr. J. B. Mur-

phy, from post-peritoneal hemorrhage; post-mortem showing the intestinal wounds to have been safely sutured. One other case of recovery is reported by Dr. J. J. Skelly, of Potomac, Ill., and two fatal cases coming under my own care, to which further reference will be made in this paper; in all thirty-six cases, with nine recoveries.

A reference to the extended reports of these cases, or to the tables of Sir William MacCormac, shows plainly that there has been no selection of favorable conditions; that the operations have been done under a great diversity of surroundings, without special assistants, and in many cases with injuries the fatality of which it seemed impossible to overcome.

These results furnish the greatest encouragement for further trials in saving the lives of persons so certainly condemned to death, unless relieved by operation, when suffering from the wounds under consideration.

Every case, whether of recovery or death, following operation should be published in full, so that our experience may be increased, the nature and character of these wounds better understood, and definite rules of procedure elucidated. We might in this way be able to set aside those cases, which from the special character of the wounds will necessarily prove fatal. With our present limited knowledge of reliable symptoms, all is uncertain with an unopened abdomen. Gradually we may be able to positively recognize these cases which possess "a faint hope of relief" to be followed by a good percentage of recoveries after operation. Where to draw the line, and what to do, when operation is decided upon, and how best to carry out the necessary manipulations, are the questions which the future must settle.

Judging from the valuable papers of Drs. Bull, Dennis and Bryant of New York City, Dr. Tremaine of Buffalo, Dr. Nancrede of Philadelphia, Dr. Senn of Milwaukee, Dr. Marcy of Boston, Genl. Hamilton of Washington, Sir William MacCormac and others, and from the expression of opinion, published as coming from the surgeons present at the last meeting of the American Surgical Association, it is certainly just to claim, that the belief that surgical interference in proper cases is the accepted course to pursue is rapidly being adopted by the profession at large.

To me this is a great victory gained. The method of procedure has been tried; and notwithstanding the crudest of data to build upon—the deficiencies in practical experience in man; with propositions already made not thoroughly tested, or perhaps only superficially studied, with the dimmest of light for a guide, the results have been remarkably good.

What interferences are justifiable from an external gunshot wound of the abdominal walls?

A single wound of the abdominal walls, in so far as it affords any inference at all, from its being single, furnishes a hope that no penetration of the peritoneal cavity has taken place, but it is merely a hope.

The resistance of the walls and viscera, though considerable in every case, varies greatly. Consequently, a bullet, although not having momentum enough to make an exit, may have force enough to do much damage among the viscera. Or its momentum may be so slight, and its direction so oblique, as to cause it to remain between the planes of the abdominal walls. Even the existence of an entrance and exit wound widely separated is not always a proof of injury to the viscera. Observations have shown, both on man and the lower animals, that a bullet may enter the abdominal walls at one point and reappear at another, at a considerable distance from the first, and yet not enter the abdominal cavity. If penetration be present with only a wound of entrance, it suggests that the firearm used might have possessed moderate penetrating force, that the velocity of the bullet may not have been extreme, and that the damage done by it is very likely amenable to treatment, with fair prospects of relief.

If there exists a continuous track of tenderness, especially if accompanied with slight redness, from the wound of entrance for some distance over the abdominal surface, it is fair to infer that the missile has wormed itself between the layers of the abdominal walls, and that penetration does not exist. This was plainly shown in a case seen in 1886, and reported by myself in a paper read in New York that year.

The peculiar appearance presented by the edges of the wound, and its size, when carefully studied, will furnish pretty reliable information of the size of the bullet, and its direction

of impact, both items of considerable importance in estimating the possible damage.

Bullets from firearms of large calibre are the most destructive to the opposing tissues, and have the maximum penetrating force. A large bullet hole argues a large bullet, certainty of penetration, and large destruction of tissues and organs.

Powder marks on the clothing or body prove a close body shot, and hence greater probability of complete penetration of the abdominal cavity, with wounds to the viscera; and this is true, no matter what may be the calibre of the firearm used.

If the edges of the skin perforation are equally stained throughout and clean cut, the fact suggests that the bullet struck perpendicularly to the surface upon which the wound is found. Again, if these edges are unequally stained, if unequally ragged, or if the surrounding surface shows a stain, or abrasion, or discoloration leading to some portion of the edge of the perforation, all these facts suggest valuable information as to the probable course of the missile in its transit through the abdomen, and the conclusion is justifiable that the impact was not perpendicular to the surface, and, of course, in proportion as the course of impact departs from the perpendicular, the greater is the probability that penetration of the cavity has not occurred.

Naturally, one of the most important items of estimation is to determine the probable course of the injuring body. To this end information as definite as possible must be obtained as to the direction in which the shot came, and the distance from which it was fired; both facts having great bearing on the organs wounded, and the damage done them. It is no easy matter even with very complete data to guide one, to feel certain as to the direction of the missile inside the cavity, when there is only one wound. A great many cases will furnish no corroborative information; the surgeon will be compelled to depend upon the signs belonging to the wound itself.

If in doubt as to penetration, the wound should be enlarged by an incision directly through the skin perforation in some chosen direction. By carefully following the track of discoloration left in the tissues by the bullet, not only the fact of penetration or non-penetration will be positively determined,

but its directness or obliquity through the abdominal walls, will furnish positive information as to the course of transit of the entering body. With the usual precautions this incision will not increase the patient's danger, even if central section becomes necessary; it throws valuable light upon subsequent requirements, makes clear the fact of penetration, or non-penetration, and, in some situations, may enable the operator to repair all the damage done.

The presence of a wound of entrance and exit, produced by the firearms and missiles of the present day, especially if the shot is delivered in close proximity to the body, with scarcely an exception possible, indicates injury to all the fixed organs lying in the estimated line drawn between the two external wounds made by the missile. Moreover, it is highly probable that the small intestines are also damaged, although these latter wounds may be found some distance away from the line of the ball, their changed position being dependent upon the extreme mobility of the viscera at the time of the receipt of the wound, and from the movements of the body subsequent to the passage of the bullet or other causes.

The great majority of double wounds tell positively of complete and direct perforation and damage, more or less severe, to every organ in their path, there seems scarcely any probability of deviation from their course, caused by the resistance of the soft tissues of the body.

Whether wounds in organs (as contended by Prof. McGraw), found some distance away from the line of transit of a bullet, are to be explained by the elasticity and mobility of the tissues, their constant change of form by inherent contraction, enabling them to get in or out of the way, or by subsequent change induced by weight of the bullet or movements of the body; or, as contended by myself, are sometimes dependent upon an erratic course of the latter, from deviations in its line of flight, caused by deflections therefrom, through impingement on tissues of different powers of resistance or elasticity, is a matter that must be settled by an appeal to physical laws through experimentation; it will never be settled by assertions or assumptions. I am fully convinced that the time does come in the "life" of a flying bullet when its velocity and power of



penetration bear such a relation to the power of resistance of the different tissues in the abdominal walls and contents, that the softest of these, touched in a certain way, will deflect its course. In no other way than through this supposition have I been able to explain the character and kind of damage I have seen done by a bullet in its transit through the body.

My conclusions and deductions, on the course of a bullet, are based mainly upon the results of experimentation, during which the animal was profoundly anesthetized, and consequently muscular contraction and activity abolished. If the ball deviated at all from a straight line, there was nothing else to cause the deviations but the soft tissues in its track.

The situation of the wounds will, of course, call attention to the likelihood of damage inflicted upon the organs, in the probable course of the bullet. The severity of the injury and gravity of prognosis is surely greatly enhanced if the movable viscera are wounded. It is much less if only fixed organs are hit. In both the absolutely necessary manipulations by the surgeon, required for the repair thereof, will be suggested, and due preparation to meet all indications can be provided for. There is no opportunity to hunt up necessary appliances after the operation is begun.

An antero-posterior shot below the level of the umbilicus and well toward the lateral surfaces of the body, will be very likely to miss the small intestines entirely and expend its damage on the large bowel, as in Prof. McGraw's case. The same kind of wound high on the lateral surfaces may pass into or through the liver, without injuring the intestines, or the spleen alone if the entrance is on the left side.

If the wound is so situated that the bullet enters the abdomen through the diaphragm, adding injury of abdominal viscera to that of the contents of the chest, the surgeon's help will probably be of little use.

A wound of entrance and exit, or an entrance wound alone showing perforation of the ball from side to side through the cavity, means the worst of injuries, and suggests the need of the greatest care in staying of hemorrhage, repair of intestines and toilet of the contents.

Antero-posterior perforation, if complete, can only fail to



wound the small intestines when situated well on the outskirts of the surface of the abdomen ; seemingly, there can be no exception to this proposition, save in those extremely rare instances, in which the perforating body traverses the cavity without injuring the contents.

Penetration through the posterior walls of the cavity, if complete, with likelihood of laceration of important fixed organs, argues an injury of the most severe character, one in which the surgeon's art will be of no avail in the majority of instances. The exceptions, in which the severity will not prove unsurmountable, will be transit through the space between the lower end of the kidney and the crest of the ilium, and in wounds occupying the outskirts of the entire posterior surface. If the penetration be incomplete, as can, in the majority of instances, be determined by enlarging the bullet wound, the injuries are by no means necessarily fatal, and do not require any other surgical interference than enlargement of the wound and proper dressing. Many instances are recorded of recovery from posterior penetration of the large and fixed viscera of the abdomen, without any surgical operation whatever.

What collateral evidence influences the formation of a diagnosis?

The peculiarities of the individual injured constitute so important an element in the development of collateral manifestations, that all such testimony should be subjected to the most rigorous search, in fact much value cannot be attached to subjective manifestations. It is not necessary to state to you that one person may be prostrated and literally frightened to death by the sound of a firearm, or the "swish" of a bullet, while another will continue his course or perform his usual duties after he has been injured, and can only with difficulty be persuaded that he has been shot. Between these two extremes all gradations present themselves.

There are other phenomena, independent of personal peculiarities, which contribute to the formation of the surgeon's opinion. Among these may be mentioned: tympanitic resonance, unusual dulness on percussion, the presence of faecal matter, or any of the normal secretions or contents of the different viscera in any of the external wounds, blood in the

stools or urine, or egesta from the stomach, paralysis of any kind, persistent nausea and vomiting, and the general condition designated shock.

Allow me to briefly refer to the probable significance of these symptoms when present.

Unusual and rapidly forming tympanites would suggest the escape of the intestinal gases into the peritoneal cavity through a perforation, and, if found in a region of normal dulness, as in the liver region, it is considered good corroborative testimony in favor of intestinal rupture, by some authorities.

Circumscribed dulness on percussion, with localized bulging in the abdomen in the neighborhood of the wounds, or in the most dependent region of the cavity, argues the possible presence of blood accumulation from wound of a large vessel, and consequent penetration of the abdomen.

The rare but possible phenomenon of fæcal matter appearing in the external wounds renders the demonstration of perforation of the alimentary canal absolute. That such extrusion does occur as an early symptom after wounds made by large bullets finds illustration in the case to be reported by myself in this paper.

The presence of blood in the urine, in connection with the situation of the external opening, demonstrates wound of the kidney, ureter or bladder; the two former adding greatly to the gravity of the prognosis, and certainly in so far as its presence influences opinion at all, such condition would favor the necessity for operative procedure.

Paralysis of any part of the body, below the level of wounds in the abdomen, necessarily complicates matters very much, rendering it very probable that the ball has not only injured the viscera in its course, but has also done irreparable damage to the spinal cord or important nerves.

"Shock" cannot be relied on as a positive indication of the presence or absence of perforation of the viscera. Cases with many perforations have presented no evidence of shock whatever. Its presence is rather an indication of some special nervous condition of the patient, of some injury to nervous structure, or, perhaps, more often than any other condition, it indicates the laceration of some large blood vessel with free bleed-

ing, the last a condition of itself requiring abdominal section for its relief quite as surely as the rupture of the sac of tubal pregnancy, and proving quite as fatal if the operation is not done.

It is to me a source of disappointment to be compelled to put the presence of "shock" among the doubtful signs of perforation, for I was at one time fully convinced that its presence surely meant bowel wound, and I am still of the belief that when present, the probability of such injury is very great.

Absence of pulsation in either of the femoral arteries will call attention to injury of the iliac vessels, and as well, when present, gives a second point with which to estimate the course of the bullet.

In three cases of penetrating wounds seen by me, all had persistent nausea and vomiting present. Other reported cases have shown similar symptoms. It is also a common symptom with ruptured intestine from other causes: hence I deem it proper to claim that its import as a symptom be borne in mind.

What symptoms make it probable that the issue in any case will be fatal, whether operated upon or not?

It seems quite proper to say that the majority of cases of through and through perforations of the abdominal cavity, with injury to both fixed and movable viscera and blood vessels, will prove fatal in spite of the best efforts to save them. Still, it would not take much time or thought to bring to mind instances of individual experience, or cases of record, in which the injuries done to abdominal viscera, and the shock incidental to a prolonged operation performed in recognized procedures for the relief of abdominal tumor, has been quite as severe as could be produced by a bullet in transit through the cavity, and yet the patient has survived. So it becomes a difficult matter to decide when to decline operative interference. Cases of recovery have followed surgical care of the wounds when many perforations of the intestines<sup>1</sup> were found, and in which solid viscera<sup>2</sup> have been traversed by the bullet; many

<sup>1</sup>Hamilton, Bull.

<sup>2</sup>Murphy.

cases have perished in which, after death, examination showed the simplest injury to repair, and indicated the probability of speedy recovery had the abdomen been opened at once and the wounds treated. One is almost tempted to say that all cases are entitled to the chance of life offered through operative procedure. It is hazardous to predict a fatal issue. However, if the abdominal wound is complicated with a severe injury of the spinal cord, or bad wound of the solid viscera, or so great a time has elapsed as to allow of extensive extravasation and infiltration, with consequent virulent inflammation, the probability is that the issue will be fatal.

In application I will present the following cases :

Mr. J. F., shot himself in two places in rapid succession with a 32-calibre revolver. I saw him four hours after the injury was produced, and found two bullet wounds, four inches to the left of the median line on the same line with each other and one and one-half inches apart ; the lower wound was even with the umbilicus. One bullet had gone through the body; its exit posteriorly was just below the last rib and close to the outer edge of the erector muscle. There had been and still was considerable hemorrhage going on from the posterior wound. He had eaten a hearty dinner just previous to the shooting. The patient was moderately collapsed, pulse very fast and countenance pale. By the time he was anæsthetized and necessary preparations were made, darkness had come on, and the operation was done with the light from a single gas jet.

The two bullet wounds were joined by an incision and the fact of penetration demonstrated. An opening was then made in the median line four inches long through the abdominal walls. Considerable blood was found in the peritoneal cavity. This was removed and the wounded intestines sought for. These were easily found and the perforations quickly closed with a straight needle, carrying No. 1 silk thread. Five perforations were found and secured. On examining the posterior peritoneal surface a bullet perforation was found in it directly over the body of the left kidney. On passing the finger through it the kidney was found to be perforated by the bullet. The hemorrhage from the wound was at this time very slight. During this period operative procedures had to be discontinued several times to prevent the patient from choking during his attempts to evacuate the stomach, as he was vomiting large masses of meat and other food. The kidney was not removed. The wounds were closed, dressed anti-

septica and the patient put to bed. He rallied fairly well in a few hours and seemed to progress nicely for twenty-four hours, when he began rather suddenly to fail rapidly and died in collapse. There had been considerable bleeding from the posterior wound, and the patient died from hemorrhage from the wound in the kidney. It is to be regretted that the organ was not removed. The other wounds were comparatively simple in character and easily secured. There was but slight extravasation and the cavity was left quite clean.

P. J., aged 45 years; was shot while walking in the street on the night of July 4th. He was seen by me at the Presbyterian Hospital sixteen hours after the injury was inflicted. I found a large-sized bullet wound in the right iliac region, slightly below and two inches inside of the right anterior superior spine. The surface had been rendered aseptic and the patient anesthetized before I examined him. The edges of the wound were more ragged and more deeply discolored on the outer and upper portion, showing that the missile struck obliquely to the surface of the abdomen and that its direction was from the right and above. Considerable fecal matter was found in the wound. The man held his right thigh semi-flexed even when fairly anesthetized. The right half of the abdomen, the upper portion of the thigh and buttock was fiery red in color, the margin of the erythematous blush being well marked. The respiration was entirely thoracic, the abdominal walls hard and motionless. An incision was at once made in the midline after emptying the bladder of a pint of urine. As soon as the peritoneum was opened large quantities of a stinking ichorous serum poured out, bringing with it fecal matter and small pieces of potato undigested. This material was washed away by a free flow of mild boric acid solution. The wounded intestine was then sought, and after drawing out about six inches of badly inflamed tube, it was reached. It was a large perforation of the small intestine, but was secured by the continuous suture, without difficulty. All the folds of the bowel in the iliac fossa and pelvis were examined, but no other openings were found. A question of perforation of the bladder was raised, but a thorough examination with finger failed to find any. To further prove the uninjured condition of the bladder, it was distended with warm milk, but no leakage was noticed and the milk was allowed to flow away through the catheter. The external bullet wound was enlarged and its track followed by the finger. The missile barely entered the abdominal cavity at the fold between the abdominal walls and iliac fossa, and just outside of the femoral vessels, and was then lost in soft parts of the thigh on posterior surfaces. It evidently gouged out the convexity of the knuckle of intestine lying in its course.



After thorough cleansing, the wounds were all closed and drainage left in the abdominal cavity. It was now noticed that the patient had abdominal respiration and straightened his right leg. The operation was done in the presence of Profs. Gunn, Etheridge and Merriman and Drs. Talbott, Mellish, Ward and others. All expressed their belief that no other incision than that through the midline would have enabled the surgeon to as easily and positively repair the injury and cleanse the cavity. The man died sixteen hours after the operation. With such extensive extravasation and virulent peritonitis as was found, no other result could be anticipated. With an early operation I believe the recovery would have been prompt in a case with so simple a wound and the absence of any complication. The case certainly points to the necessity of prompt relief in these injuries. The post-mortem confirmed all the facts ascertained during the operation, and I have present a section of the bowel showing the wound and the condition of the suture used to close it.

One can fairly believe that the abdominal incision adds but little to the patient's danger, and if there be any, it is quite offset by the benefits accruing from a perfect knowledge of the wounded person's true condition, as is exemplified in the following case :

Dr. John I. Skelly of Potomac, Ill., reports, in the July number of the ANNALS OF SURGERY, a case of penetrating shot wound of the abdomen. The cavity was opened by median section, no injury to the intestines was found, the bleeding was controlled, the peritoneal wounds sutured and the patient recovered. The injury was done by a bullet from a 32 calibre revolver. Great shock was present in this case although no important viscera were wounded. Dr. Skelly refers especially to the great confidence in recovery, expressed by the patient, when assured that the intestines were not injured.

*What technical measures are best in the treatment of bullet wounds of the intestines, mesentery, stomach, kidney, spleen, liver and bladder?*

It is yet my firm conviction that in the great majority of cases the incision in the midline, will allow the most room for all the manipulations absolutely necessary on the surgeon's



part, and yet be conducive of rapidity of action. It will furnish the surest way of following the course of the bullet, and thereby enhance the certainty of securing all injured viscera in all cases of through and through perforation especially if the course of the ball is transverse, oblique or median. It will furnish the best way of reaching all parts of the cavity through which to insure perfect toilet of the peritoneum. Prof. McGraw's case shows there may be exceptions to what it seems should be the general rule. Here, as elsewhere, each case has its own indications and must be managed according to them.

It seems proper for me to refer to a few conditions found in the wound of the intestine itself dependent upon the character of the ball producing it, previous to passing in review the means to be adopted for its closure:

The character of the wound in the bowel depends greatly upon the size and shape of the bullet producing it, and much also upon the velocity of the missile. Round bullets moving rapidly make a clean cut, rather small wound with the minimum amount of bruising, so that they are comparatively easy to close. Rapidly moving conical bullets do much more damage than the round, still even with these, the great velocity makes the injury less severe than might be expected from such terribly destructive agents. The extent of bruising is greater, the edges of the perforation are more ragged, still if they strike the tube fairly in the lateral surface many such wounds can be safely managed without resection. The greatest amount of damage, in my experience, is done by the rather slowly moving missile be it either round or conical; these tear, mash and lacerate the tissues instead of making a clean punch, like the swift ones.

However made, the large proportion of perforations in the bowel will be well secured, and quite rapidly, by means of the continuous stitch, applied so as to invert the edges of the wound towards the lumen of the tube, by entering the needle, a safe distance, away from the margin of the wound and sewing over and over until all of it is covered with the opposite surfaces of the peritoneum held together by the stitches.

As the result of experimental research the following state-

ment was made by myself in 1885 in an address before the American Medical Association, written on this subject, "This way (that is the use of the continuous suture) of treating the bullet openings in the bowel is susceptible of much wider application than would appear possible at first glance. I am quite well satisfied that it will take the place of excision in not a few cases of quite severe injury. The torn edges of the wound can be turned in, and peritoneal surfaces fastened together, even in large wounds, with perfect confidence in the result of safe and secure adhesion following."

This statement has been borne out absolutely in my own experience since then in the human being, and I believe it is the experience of all other operators. In no instance in any of the reported cases submitted to surgical treatment, since then, do I remember that the operator has been called upon to make a section of the bowel. All seem to have trusted to the continuous suture over the inverted wound. The recoveries are a positive evidence of its success and none of the fatal cases show a failure to secure the bowel wound by its use. It apparently makes no difference whether the wound in the bowel is closed parallel to the course of the tube, or transversely or obliquely. The result is the same, provided the stitches are securely taken. Of course the most easy and most rapid method of procedure is the best to be adopted and of this the operator must be the judge.

With a through and through penetration of the cavity, we may expect to find clean perforations and the openings of minimum size in the intestine; with a single entrance wound, arguing diminished velocity of the bullet, the tube openings will be very likely ragged, bruised and difficult to repair without sacrifice of intestine.

If the perforations found in the bowel are situated fairly away from the mesenteric surface, little difficulty will be found in carrying out the manipulations necessary for their closure. Still in cases in which many perforations of the tube are close together, the intervening portions between the wounds, have their vitality so greatly impaired by contusion, that complete resection of the implicated portion of intestine will be required.

When the ball opening is directly at the mesenteric junction repeated instances of imperfect union followed by extravasation have occurred to me in experimentation. This kind of injury requires exceptional care in the application of the sutures, so that they include something more than the peritoneal covering, and do not include the larger blood vessels entering the coats in this position.

When the injury is so extensive as to positively require resection of the wounded portion, my experience from experimental inquiry, was positively in favor of two methods of procedure. 1st, cases in which the mesenteric border could not be saved, were most successfully treated, by making the section in healthy bowel tissue, and removing the injured portion with a triangular piece of the mesentery, the base of the triangle representing the length of intestines, removed. The first sutures are best introduced at the mesenteric border of the divided ends of the intestines, because this plan furnishes more room, in which to make sure of the engagement of sufficient tissue in the loop of the suture, to make a fast and secure hold, than there would be if the other portions of the circumference were united before reaching this border. Failure to get good union, and to avoid extravasation, followed in every case in which this plan was not adopted.

Neither in man nor animal, have I found it necessary to introduce more than one row of sutures, either in the repair of single perforations, or in complete resections, provided the hold of the suture included about one-third of an inch of peritoneum with underlying muscular coat, and the sutures were placed about one-eighth of an inch apart.

In no instance, in my experience, except when drawn too tightly, have the sutures failed to perfectly close the opening so that at the end of twelve hours sufficient plastic adhesion had taken place to resist powerful hydrostatic pressure, and, that too, in cases in which there were thirteen perforations in eighteen inches of intestine.

That method which safely accomplishes the object of surgical interference, in the quickest possible time, and with the least possible disturbance of the viscera locally, or in general, is the best to adopt; saving of time alone is of vital importance to the patient.

The edges of the divided mesentery should be sutured and all raw surfaces covered with peritoneum by means of stitches, with very fine catgut or silk, in order to avoid leaving any secreting surfaces free in the peritoneal cavity.

2d. Cases in which the mesenteric or nutritive border can be saved. A plan which I have successfully adopted experimentally is as follows: The wounded part is cleanly cut out leaving the uninjured mesenteric portion. From this the mucous membrane is stripped, and the muscular coat with its peritoneal covering, drawn downwards in a loop. This loop is closed with stitches and the bowel circumference remaining, fastened as in complete resection. This method produces no flexure of the bowel and does not interfere with the free flow of blood in the vessels coming from the mesentery.

The most reliable and safest clamps, for use in holding the bowel, during the manipulations of making a resection, were found in experimentation to be the fingers of an assistant, and further experience has not changed the result of that observation; they can do the least damage, and produce the least amount of shock, and will prove an intelligent aid to the operator.

The wounds of the large intestine can be rapidly, and usually easily repaired by means of the continuous stitch on account of their large calibre and comparatively thick walls. Here, if anywhere, the wounded bowel can be reached through an enlargement of the external bullet opening, as has been successfully done in one case by Prof. McGraw, of Detroit, but this is only possible, in my opinion, in cases in which the shot is a direct antero-posterior one, over the course of the large intestines, and does not touch any small intestine. It seems impossible to me so easily to find the injured parts, or so rapidly repair them; or to carry out so successfully proper cleansing of the cavity, through any other incision than the median section, in oblique or through and through penetration in any transverse plane of the abdominal cavity. My belief is based upon trials on the cadaver, and living animals, and wounded men. No other incision, to my mind, gives such perfect command of the entire cavity.

In one instance an incision extending over the entire length

of the lateral surface of the abdomen and fully to the midline of Poupart's ligament, failed to enable the operator to find the vessel from which the fatal hemorrhage came. The track of the bullet could be traced to the opposite side of the cavity, but the intestine could not be drawn through this lateral incision so as to properly explore the course of the ball. There was no wound of exit. It seems very probable that the median section, by bisecting the bullet's course, and allowing easier access to the cavity would have made this case, as it will others, simpler to manage, at least.

It is a matter of record in surgical experience that the wounds confined to the large intestines have often been recovered from without surgical interference, still, it is certainly probable that the number of recoveries will be increased, and rapidity of restoration to health more surely provided for, by closing the wound in the intestine and cleansing the cavity at once, and without adding materially to the patient's danger.

In animals, and probably likewise in man, a perforation of the great omentum is followed, sometimes, by a universal extravasation of blood throughout the meshes of the mass, producing a condition that requires ablation of the greater portion, after proper ligation. The end of the stump left after separation can be covered by sewing adjoining surfaces of peritoneum over it. All slits or openings in the mesentery should be carefully closed with the continuous suture so as to avoid contaminating secretion into the peritoneal cavity.

The wound in perforations of the stomach is occasionally difficult to find, but when found, no difficulty is met with in applying the means of closure. The continuous suture has not failed to securely fasten them, and in every instance they have been followed by speedy recovery unless they were complicated by severe injuries to other viscera.

There are on record quite a number of cases of penetration or perforation of the liver alone followed by recovery. If in doubt, with a posterior wound of entrance, enlargement thereof, with antiseptic care and dressing, would be justifiable. With an anterior wound, the course pursued by Dr. Murphy, of Chicago, in a case reported by him, was followed by recovery. Median section was made, the cavity cleaned of blood,



and the wounds on the surface of the liver drawn together with catgut sutures. In my experience, wounds of the liver were managed in the same way and did well if the sutures were deeply placed.

Wounds of the spleen bleed freely and are difficult to manage with sutures on account of the brittle nature of the spleen tissue, still sutures rather deeply placed will hold the edges of the perforation in apposition. If badly lacerated, the many reported cases of recovery, after complete removal of the spleen for injury, rather indicate that extirpation is the best means of treatment in such injuries.

Perforation and wounds of the kidney, from the character of the organ and the profuse hemorrhage from its torn surface, from the danger of urinary infiltration and decomposition, seem impossible to manage without extirpation, especially if injured by an anterior wound of entrance. In one case of my own a complete perforation of the kidney was found. It was decided to leave the kidney. The patient did well for about twenty-four hours and then succumbed to a profuse hemorrhage from the wounded organ. It seems the chances would have been better with it out.

If the kidney is wounded, with posterior opening only, and enlargement thereof shows the injury to be confined to this organ alone, the cavity of the abdomen is not perforated, and recovery is possible either with or without removal of the organ.

Perforation or damage done to either the liver, spleen or kidneys, accompanying similar injuries to the small intestines, greatly increases the gravity of the case, and probably very few cases will recover, whatever is done for their relief.

Sir William MacCormac has positively demonstrated the success, following abdominal section in ruptures of the bladder, in order to securely suture the wound. It is proper to infer that bullet perforation of the viscus can be quite as easily secured in the same way.

The results of the experience of Varick, of New Jersey, and Wylie, of New York, should always be borne in mind. They have demonstrated that hot water introduced into the peritoneal cavity accomplishes three purposes of great moment: relief of shock, arrest or abatement of hemorrhage, and cleansing of the cavity.



I think carbolized silk of fine size is the best material to use for the bowel suture, simply because perfectly reliable catgut cannot always be obtained, and the risk is too great, if there be the least likelihood of any strand giving way. No doubt, well prepared catgut may answer every purpose, but the silk never fails to do the work required of it satisfactorily.

If asked what are the points most likely to be neglected or slighted in such an undertaking as giving surgical relief to a case of perforating gunshot wound of the abdominal viscera, my attention would be drawn to the items leading to failure in experimentation, and the conditions mentioned as found in the repeated unsuccessful cases in man. Among these would come first the paramount necessity of searching out and securing all bleeding vessels, dependent upon the danger of immediate or secondary hemorrhage. Hamilton, of Washington, tells us that his successful case passed through a period of extreme danger, in the last days of his illness, from the formation of a blood tumor. Murphy, of Chicago, reports a case lost from post-peritoneal bleeding. And in this case post mortem showed all the intestinal wounds thoroughly closed and water-tight. I have reported a case in which the immediate cause of death was kidney hemorrhage.

It is, no doubt, a hazardous ordeal to put a patient through, to examine the intestines from one end to the other in order to be well satisfied that no perforation has been over-looked, yet it is far more hazardous (in fact the result will be surely fatal) to leave an opening in the small intestines untreated. In some of the reported cases wide open bullet wounds have been found with their surrounding fecal extravasations and contaminated blood.

It is to me extremely doubtful if all the wounded parts will be found, in an estimated transverse plane drawn through the demonstrated track of the bullet, especially if the missile implicates the ever gliding and moving small intestines. I am not prepared to believe that a supposed probability as to the seat of injured parts, should take the place of a regular, carefully made and satisfactory search for the wounds, and yet I would very carefully avoid practicing, or advising any procedure that might unnecessarily add to the shock already pres-

ent. We do not know all that it is best to do yet, and still we do know that failure to close all the wounds means death to the patient, and some risk must be taken to avoid so great a hazard.

It needs no argument or demonstration to prove the harm resulting from tight suturing. It has been my experience to see in animals the edges of several wounds slough away to the extent of the bowel tissue included in the sutures, followed by extravasation, making a failure out of a case that otherwise gave good promise of being a success. The temptation is great to be over-sure of good union. In my experience peritoneal surfaces need only be laid in contact with each other and kept quiet for a few hours in order that adhesion may occur. The paralyzed condition of the bowel at the seat of wound from the injury, in itself favors this desirable quiet.

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## THE OSTEOGENIC FACTORS IN THE DEVELOPMENT AND REPAIR OF BONE.

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[CONCLUDED FROM PAGE 396.]

*Proposition F.—The periosteum does not initiate the reproduction of bone, as the following facts show:*

If a healthy adult bone be removed subperiosteally, without previous irritation, very little fresh bone is reproduced. The osseous matter which does appear is generally confined to a few nodules or plates scattered over the surface of the periosteum. The periosteal tube collapses, and its position is afterwards marked by a layer of fibrous connective tissue which ultimately becomes absorbed. The few osseous plates which do form are also apt to become absorbed, possibly from muscular movement which has been permitted to take place

after the lapse of a time sufficient to allow of ossification. On stripping the periosteum from unirritated healthy bone, a number of vessels from the Haversian canals with their surrounding connective tissue, adhere to the periosteum and are detached along with it. The connective tissue surrounding the vessels in the Haversian canals is apt to have formative osseous cells entangled in it, they having probably been poured out consequent upon some interstitial change going on in the bone. It is probable that it is from such centres that the osseous nodules and plates, found on the internal surface of the periosteum, spring.

If a matured bone has been submitted to irritation for a sufficient time to enable new bone to be formed, and the old bone be then removed subperiosteally, good sound bone is reproduced. This is on account of the formative osseous elements having been poured out on the surface of the bone from the Haversian canals during the irritation of the bone, and becoming entangled in the meshes of the periosteum. A layer of new bone is thus formed on the periphery of the old, and on the under surface of the periosteum, which serves as a starting point for the formation of new bone by the proliferation of the osseous elements.

The result of extensive observation and experiment on these points may be thus summarized:

When acute suppurative periostitis is set up so as to denude the adult bone completely of its periosteal covering, and when the bone is at once removed, through a longitudinal incision, leaving the periosteum complete, and still maintaining its intimate relations with the surrounding soft parts, the subsequent course does not reveal any or almost any development of bone. As a rule, the walls of the periosteal tube tend to fall together, to coalesce and to form a fibrous layer which shrinks, through time, so that instead of a bone, half an inch in diameter, being formed, a mere connective tissue cord results. Or it may happen that a few spicules of bone may develop in the fibrous cord. Both of these are, bye and bye, absorbed.

If, instead of permitting the periosteal tube to fall together after the removal of the bone, it be stuffed in such a manner as to keep the walls separate, until filled with granulation, the

result is not much different; the fibrous cord which remains may be thicker, but the development of bone is very meagre or absent. Even when irritation is maintained after the bone has been stuffed, no greater osseous development ensues.

It may be, however, asserted that in such cases the periosteum has participated in the inflammation to such an extent that its inner layers have been destroyed, and hence the osteogenic portions have been obliterated, bone production could not be expected. To meet this, data from two points could be furnished. First, it is just from such cases that well formed bone is produced under the periosteum. When the bone, instead of being removed, is allowed to remain in its place for a period of weeks or months, a thick layer forms a shell round the old bone. The osteoblasts have been thrown out in abundance from the bone, owing to its irritation, and have been accumulated in the meshes of the connective tissue. The second point is that when perfectly healthy periosteum is torn from a mature bone the connective tissue from the Haversian canals is partially removed with it, and it adheres to the periosteum. It is presumable that the nodules of bone which grow on the under surface of the periosteum are formed from the proliferation of the cells contained in the connective tissue removed from the Haversian canals. When the same periosteum is transplanted only small nodules of osseous matter form on the graft.

The bone is destitute of periosteum at those points where tendons are inserted into it. After removal of dead bone, the osseous matter develops quite as freely at those parts, as at the others covered with periosteum. It has already been seen that where the periosteum has been removed from the surface of a bone, cells have been poured from it, so as to cover this portion of bone, a new osseous layer being formed, as well as a superficial layer of connective tissue representing the periosteum.

OBS. XV.—Subperiosteal excision of the elbow has been performed by me on at least sixty cases. In it the periosteum is elevated from the olecranon, and distal extremity of the humerus, with the object of retaining *intact* the aponeurotic and muscular connections which are

adherent to its outer surface. There are generally a series of osseous plates adhering to the under surface of the periosteum which have been abrupted from the softened bone on elevating the periosteum. If these osseous plates are allowed to remain, the cells composing them will proliferate, the plates will increase in size, fresh bone growing from them, often to such an extent as to render the movements of the elbow-joint muscle restricted. If, however, the periosteum be closely scrutinized, and all the osseous plaques be carefully removed from its surface, no fresh bone forms, union taking place by fibrous tissue. This occurs with a regularity and constancy that may be relied on, so much so that this practice of removing the osseous plates has been regularly carried out by me in these cases, with the invariable result of no fresh bone being produced from the periosteum which had been left intact.

In these cases, besides the grosser lesions of caries and necrosis, the olecranon has undergone interstitial changes often of an extensive kind, and in many instances it is softened. Occasionally, there are zones of new bone in the interior, and in immediate proximity of such are areas which are undergoing absorption. The chronic inflammatory action proceeding in the interior has caused a pouring out of cells from the Haversian canals, on to the surface of the bone where they have become ossified into plates, while these form part of the periphery of the bone. These, however, are easily separated from the softened bone, where the dense fibrous membrane is peeled from its surface.

Some suppose that in the case of fractures the soft tissues, muscles, etc., which surround the fracture contribute to the formation of ossifying callus. It is true that all the mesoblastic series of tissues are potentially convertible into one another; but there is no evidence for the belief that a healthy muscle, though injured, does assist in the regeneration of bone. The very same phenomena appears when bone has been accidentally obtruded into the interior of the cerebral tissue, and permitted to remain there, fresh osseous increments being added to it. This is well illustrated by several cases which have been seen by me, in which portions of fractured skull have been driven into the brain, and have been removed many months, and some even years subsequently. One may be summarized here.



OBS. XVI.—A patient had received a severe injury to the skull, by the fall of coal in a pit. Eleven months after he came under observation for symptoms demanding surgical interference with the skull and brain. Among other injuries, a portion of the internal table of the skull was found to have been detached and driven through the brain membranes into the brain where it lay for fully an inch in length, by three-quarters in breadth, completely surrounded by cerebral tissue. There was no distinct encapsulation of the bone. When removed, it was seen to have both sides equally polished, the roughened surface torn from the diploe, had been filled up with fresh deposition of bone, as were likewise the irregularities of its margins, which had been all rounded off. Therefore, this bone had grown after it had been detached from the interior of the skull, and while it was in contact with the cerebral tissue. It is presumed that no one will hold, that those fresh osseous deposits came from the cerebral tissue, they therefore must have come from the interior of the bone itself.

Were the soft tissues capable of contributing to the formation of ossific deposition when a fracture is produced, their intrusion between the fractured surfaces would be a gain. This, however, is just the reverse. When muscular or aponeurotic tissue intervenes between two fractured surfaces, it retards or absolutely prevents osseous union. One can only look for osseous union in such a case if the intervening membrane or muscular tissue dies or becomes absorbed. If it retains its vitality, it will prevent osseous deposition. If the portion of intervening tissue be small, relatively, to the fractured surface, then the ossific deposition from the fractured surface may be poured out to a sufficient extent to effect osseous union, the intervening soft tissues becoming slowly absorbed, leaving, however, in the bone a crevice or other irregularity to indicate its former seat. Nor is the periosteum any exception to this rule. When it has been permitted to be peeled up and stretched across one fractured surface, intervening thus in the osseous breach, union takes place by fibrous tissue. The ossific deposition being then absolutely limited by the membrane.

On two occasions this has been found by me to have been the sole cause of non-osseous union. In one very recent case an ununited fracture of the femur was found to have resulted



from the periosteum of the proximal fragment having become stretched over the fractured extremity. Numerous opportunities have been given to demonstrate the fact in compound fractures that the periosteum may be tore from one fragment and laid over one or other fractured surfaces.

This has been more frequently seen in comminuted fractures, and were it not for the fact that the periosteum is normally so tightly stretched over the bone, it would be made frequently the cause of non-osseous union.

The amount of the provisional callus depends upon not only the displacement of the fragments, the movements they have been subjected to, but also to the extent of the separation of the periosteum. The periosteum acts as a limiting membrane to ossific deposits from the interior of the bone. This is well illustrated in fractures. When a simple fracture has been produced without rupture of the periosteum, the union of bone occurs so perfectly that it is difficult after a time to discern the seat of fracture, and at no time is there much, if any, provisional callus. True, there is a slight deposition of bone under the periosteum for a short distance above and below the seat of lesion; but even this very soon wears down, and can only be detected at the beginning when the bone is superficial like the tibia. Even this thickening may not ensue if the parts be kept perfectly at rest, from the instant the fracture is produced, as is the case frequently in osteotomies, the bone having been cut across, and immediately placed in accurate apposition and maintained there until ossification has been perfected. The part where the periosteum has been cut by the osteotome generally shows a thickening of bone, though this depends upon the extent of hiatus which has been left in the rectification of the deformity.

If, on the other hand, the fracture has been attended by tearing of the periosteum, and the limb has been subjected to much movement subsequent to the production of the osseous lesion, then a large amount of ossific material will be poured out from between the fractured surfaces into the gap, and surrounding the exterior of the bone. The limiting membrane of the periosteum having been ruptured, and perhaps separated from the extremities of the

fracture, the movements made will express the contents accumulated in the osseous gap, and there will form fresh deposits outside the bone. Again, in malposition of the fragments the ossific matter is often poured out in great abundance; but, if there be on any side a continuity of the periosteum it will limit the osseous deposit at that part. Frequently, in fractures the ossific material poured out from the bone lesion covers in the periosteum. In such a case the callus is only loosely attached to the bone, and may be easily peeled off, unless the periosteum becomes absorbed, when intimate organic adhesion takes place. The very form which the callus assumes, that of a spindle-shaped swelling round the fracture, its greatest diameter being opposite the gap in the bone, and tapering off toward the proximal and distal portions of the shaft, point to the ossific matter being poured from the breach in the bone instead of coming from the periosteum or the neighboring tissues. Besides, it must be remembered that the provisional callus is not to be found alone on the circumference of the bone, but also in its interior filling up the medulla. This osteoplastic effusion can scarcely be claimed as coming also from the periosteum; the latter would indeed be a prolific membrane, if, considering its thickness, it would supply not only the mass of provisional callus on its exterior, but also the callus in the interior of the shaft of the bone. This callus is thrown out from the fractured surfaces, and also is commensurate with the amount of irritation set up.

Callus thrown out from the fracture may in certain cases be superimposed on the periosteum.

OBS. XVII.—A man, *æt.* 25 years, met with a severe machinery accident, whereby he was so severely injured in various parts of the body that he died at the end of five weeks. One of these was a compound fracture of the lower third of the thigh produced by a blow from a revolving knife which penetrated the tissues to the bone and cut the inner third of the femur in two, the fracture being completed by impact against another part of the same machine. This wound healed by first intention. At the post-mortem examination the fractured femur was found to have been fairly well united, but the apposition of the fragments was not exact. The lower one projected about quarter of an inch beyond the upper, thus causing an abutting shoulder

on the inner side, while a corresponding one from the upper fragment projected on the outer side. Over the latter the periosteum was continuous, from the upper to the lower fragment, and at that point it limited the osteoplastic growth from the bone. In the inner side, where the periosteum had been cut in two, it still retained its position on the upper and lower fragments, there being no bridging from the projecting shoulder below to the shaft above. That portion of the periosteum on the inner side of the upper fragment adhered to the bone as far as the cut surfaces. Underneath its very edge there was a slight fresh osseous deposition, while above it there was superimposed a mass of newly formed callus, which extended in one piece from the projecting fractured ledge of bone to half an inch up the shaft. It measured fully half an inch in thickness—just the extent of the projecting shoulder—and tapered from that to its termination, half an inch above. All this lay superimposed on the periosteum. A very thin new layer of connective tissue was already beginning to form on the outside of this mass.

Here, then, the callus was poured out from the cut surface of the bone, and actually buried half an inch of the periosteum covering the neighboring fragment.

*Bones are subject to constant interstitial changes.*

Bones are subject to constant interstitial changes, and are affected by a variety of causes, such as the state of health of the individual, the amount of exercise he subjects himself to, the quantity and quality of food he consumes, and the state of his secretory and excretory functions.

In the various periods of life the changes in the bones are well known. In the young they are much more soft and vascular, consisting more of cancellated tissue than cortical, and growing in length principally from the epiphyseal extremities. In adult life, the cortical layer is much greater, much denser, and the bone generally harder, although it is still possessed of elasticity. In old age the cortex is thinner, more earthy, and much more brittle, while the medullary cavity is enlarged and fatty. In debilitating diseases the bones are early affected, and often powerfully so, great absorption taking place, while in convalescence there is a regeneration and redeposition. These changes are not merely on the surface or in the medulla, but are interstitial, and in adult life proceed, while there is very

little appearance of increased activity in the periosteum, with the exception that it participates in the vascularity occurring in the whole bone.

In children the rapidity with which these changes occur is so marked that within a few weeks from the occurrence of debilitating illness, the bones may become softened and easily bent. While after a few weeks of convalescence the bones again become firm, and in the course of a couple of months, under suitable treatment, are more solid and firmer than prior to the illness. In some such cases the debilitating influence produced a great absorption of the cortical layer, the calibre of the medullary cavity being augmented, and the cancellated tissue greatly rarefied, its place being taken by fat. When convalescence has been fully established, a considerable increase in the volume of the cortical substance ensues, so much so that frequently the whole medullary cavity of the bone is filled up, so that it becomes a solid rod. At a later period, this solid rod becomes honey-combed by resorption of the solid contents in the interior, and a medullary cavity is ultimately restored, the cancellated tissue passing back to its normal consistence. Now, all these phenomena occur in the interior of the bone by interstitial change, and few of them involve the periosteum.

Pressure on the interior of a bone causes interstitial absorption, as may be seen in the process of pegging fractures with steel pins. Though when inserted they are caught firmly on all sides, yet, in three weeks they have become so loose that they may be easily lifted out with the fingers.

When a long bone has been severed in its continuity, as in an amputation, the healing takes place by the lower extremity being covered over by a mass of new bone.

The ossific elements are projected first from the medullary cavity along with the mass of granulation tissue which is poured out there from the crevices which have been formed in the rarefied cortical layer, the cut periosteum not participating in the general development of the callus. The form of the granulation tissue which ultimately becomes osseous, is dome-shaped over the extremity of the bone, the greatest convexity being opposite the medullary cavity, and from this it tapers

off toward the circumference of the bone, ending at the commencement of the periosteum. Here again the periosteum does participate little, if at all, in the osseous formation.

*Proposition G.—Bone may be regenerated independently of the medulla, which may itself be reproduced.*

In certain instances of osteomyelitis, where the whole of the medulla and the interior of a growing bone has been the seat of inflammation, producing a softened purulent pulp, enclosed in a shell of thin, though true bone, representing the cortical layer, the whole of the interior has been washed out, and after a prolonged period, complete restoration of the calibre of the bone has resulted, though in some instances, the growth in length has been interfered with, probably from involvement of the epiphyses. One such instance may be here summarized:

OBS. XVIII.—A lad, æt. 10 years, had complete destruction of the ankle-joint and bones of the foot, but besides had chronic osteomyelitis of the tibia. For the former, Syme's amputation had to be performed, but besides, the interior of the shaft of the tibia was filled with a dark chocolate pulp mixed with pus. This extended from the upper tibial epiphysis to the lower, the latter of which had been completely obliterated. The whole cavity of the tibia was filled with it, the cancellated tissue having disappeared. When the shaft was opened into, the inflamed purulent pulp flowed out. The cavity was then washed, when it was seen to be entirely empty, a shell of bone being left representing the cortex. This shell was composed for the most part of young bone. In the course of a few months the external layer of bone had increased in thickness. A new medulla had formed in the interior, and ossification had advanced in the centre of the bone, though it was distributed in irregular masses. At the termination of eight months the shaft was sufficiently firm to enable him to bear the weight of his body upon it while walking. Four years afterwards he was examined, when he stated that he walked about on it for long distances with ease. The limb was, however, considerably shorter, owing probably to the destruction of the distal epiphysis. He therefore required to wear an extra high heeled boot.

In these instances the inflammatory action had probably been initiated in the medulla, causing a pouring out of osteo-



blasts through the Haversian canals on to the periphery of the bone, where a new osseous layer was deposited between the bone and the periosteum.

After the inflamed medulla had been removed, a fresh deposit of bone filled up the cavity centripetally. This ultimately became hollowed out, and a fresh medulla was formed.

Such observations show that bone may grow and be reproduced without any medulla, and that the latter may be regenerated through the medium of the osseous tissue. Had the osseous plaques which were deposited from the bone, and which were adhering to the periosteum in these cases, been carefully taken away, then no reproduction of bone would have ensued; the tube would have collapsed, and except for the growth from the proximal epiphysis, the bone would have entirely disappeared. In many other cases the whole of the medulla has been found converted into a purulent mass, and has been washed out, and occasionally the whole interior scraped with a Volkman's spoon. The aperture has filled up with granulation tissue, and the parts have healed, the limbs being restored to perfect use.

*Proposition H.—The histo-genetic phenomena support the foregoing observations, showing that the periosteum does not generate bone.*

It is acknowledged that the growth of cartilage occurs from the cells, and the periplast or intercellular substance is secreted by the cells, around each of which a clear homogeneous capsule is found, at first appearing distinct, though becoming by and by fused into the surrounding matrix, and this process may be clearly traced. Yet, cartilage in the long foetal bones is surrounded by a perichondrium, and no one attributes the growth of the cartilage to this outer layer of firm fibrous tissue, which ultimately becomes changed in *name* from perichondrium to periosteum. If intra-cartilaginous ossification be traced, it is seen that at an early period a rod of hyaline cartilage shaped like the future bone is formed, and this is surrounded by a perichondrium. The ossification begins at the middle of the shaft and extends toward the extremities. There is first a proliferation of the cartilage cells and an infiltration of the car-



tilage matrix with lime salts. This calcified matrix does not become the future bone, but disappears. The matrix is absorbed, blood vessels growing into it. Medullary spaces are formed which are filled with cells. The trabeculæ between these spaces become covered with a thin layer of osseous tissue which is produced by osteoblasts. These cells assume an elongated branched shape when they are about to become cells. The bone matrix is a periplast, produced by osteoblasts, each cell secreting a matrix which becomes calcified. As the layer of young bone thickens, the trabeculæ of cartilage disappear by absorption. Giant cells (osteoclasts) absorb portions of the intervening trabeculæ, and in this way produce a medullary canal in the centre of the shaft. A layer of cartilage persists at the epiphysis until growth in length has ceased.

All this is clear. It is only when intra-membranous ossification is dealt with that the growth of bone is attributed to the periosteum. Those who hold to this opinion base it upon the fact that in certain stages of bone development a layer of osteoblasts is seen under the periosteum, which develops into osseous tissue superimposed upon the cortex of the bone. In considering this point it is seen that this peripheral layer of osteoblasts, formed under the periosteum, is not only in immediate contact with the bone, but the osseous structure is actually in continuity with this layer of osteoblasts, the bone growing centrifugally by the superposition of osseous lamellæ with their enclosed bone corpuscles; and if the manner in which this takes place be observed, it is seen that the osteoblasts send shoots radiating outward into the periosteum, their base being in the bone. At an early stage of ossification, two processes are observed, a deposition of earthy matter in the matrix of the cartilage, and a deposition of true membrane bone closely investing the surface of the cartilage under the perichondrium. From this true membrane bone, the osteoblastic ossification extends centripetally, the calcified cartilage matrix being previously excavated by osteoclasts. If the opinion adopted by Muller—the one which has received most adherence—be accepted, the cartilage cells are converted after undergoing division, into osteoblasts. If this be admitted, it

is evident that the cartilage cell being the parent of the osteoblast, it does away with the possibility of regarding the periosteum as the secreting or generating membrane. But the layer of osteoblasts is not only formed on the periphery of the shaft under the periosteum, but continues in unbroken line all through the Haversian spaces and canals, and even occasionally lines the medullary border. At any part where they are formed, bone is developed from them. Why the mere finding of layers of osteoblasts on the periphery of the bone should permit any one to conclude that the periosteum is transformed into, or that it secretes bone—for that is the substance of many statements on the subject—it is difficult to understand.

The osteoblastic layer found peripherally in foetal and young bones during their development, belongs to the bone rather than to the periosteum for the following reasons. First, descriptions of parts should be taken from their fully matured state and not from what is seen during their evolutionary stages. Though this layer of osteoblasts is found on the periphery of the bone under the periosteum during osseous developmental stages, yet in fully matured, healthy bone, it is either wanting, or has assumed the most meagre proportions. Secondly, if these osteoblasts were only to be seen under the periosteum and no where else, it might be questioned whether they belonged to bone or periosteum, but as they are found even during the processes of osseous development, not only on the periphery of the bone, but also throughout the whole osseous tissue lining the Haversian spaces and canals, the conclusion is that they belong to the bone as a whole.

The initial origin of the osteoblast is not thereby prejudged. Even were Muller's view accepted that cartilage cells, after undergoing evolutionary processes, are converted into osteoblasts, it is still probable that the connective tissue corpuscles derived, as they are, from the same germinal layer, may be, under peculiar circumstances, developed into osteoblasts, as the whole of the differentiated tissues, derivable from this layer, are potentially convertible into one another.

In irritation of an adult bone, the first thing noticed is the congestion of the medulla, which is the more easily produced on account of the medullary vessels not being accompanied by a solid framework.

Synchronal with the congestion there is a rapid proliferation of cells in the bundles of connective tissue which accompany the Haversian canals. At an early stage these cells are found superficially, between the bone and the periosteum, congregating round the blood-vessels at the orifice of the Haversian canals. They appear as if pressed out from these canals, having traveled in the direction of least resistance, and so gained the free surface of the bone under the periosteum. Shortly after they are found more evenly distributed under the periosteum, when this special grouping round the Haversian orifices becomes observed. This egress of cells from the Haversian canals to the surface of bone under the periosteum, is analogous to the pouring out of cells, which takes place from the fractured extremities of bone. The walls of the Haversian canals meanwhile undergo absorption, probably from pressure, possibly from some special action produced by the osteoblasts. The notches and spaces formed by the erosions of the osseous lamellæ (Howship's lacunæ) are otherwise filled with cells.

All these cells found in the medullary spaces, the Haversian canals, and under the periosteum, are identical, and the cell formations in their various parts are identical, the one with the other. The cells are small, round or polygonal, and consist, for the most part, of embryonic osteoblasts. When in the process of absorption a breach is made in the wall of the bone capsules, the bone cells having become converted into their embryonic state, escape and mix with these cells already in the medullary spaces, and become undistinguishable from them.

Ossification of these cellular elements takes place in the cavities hollowed out in the bone, in the widened Haversian canals, and under the periosteum, all in the same way. The subperiosteal osteoblasts possess the power of reproduction in a high degree, but once the irritation has been removed from the walls of the absorption spaces made in the bone, and from the widened Haversian canals, the osteoblasts ossify quite as quickly and as completely as they do under the periosteum. Besides, it must not be forgotten that under suitable conditions, the new osseous tissue develops rapidly on the surface of the bone denuded of periosteum.

The histological evidence, therefore, shows that the osteogenic matter is concentrated in the osteoblasts—either in their embryonic state or in their fully formed condition—which are found first in the interior of the bone, in the connective tissue surrounding the vessels, in the Haversian canals, and traveling from these spaces on to the surface of the bone, whether covered by periosteum or not, and also under certain circumstances into the central cavity. In the young bone these cells are found on its surface under the periosteum, and in these circumstances the periosteum, if elevated, would, in all probability, carry along with it a sufficient supply in its meshes to reproduce some bone. In the adult there are few of these cells on the surface of the bone in a state of health, but if the bone be irritated, these cells are found shortly after, entangled in large numbers in the lower layer of the periosteum.

The osteoblasts likewise fill the hollows or cavities which may exist in the bone, or which may be formed there by co-existing pathological changes, and once the excessive irritation is removed, ossification takes place within these quite as perfectly as it does on the surface of the bone. These cells may be poured out and develop on the surface of an osseous fragment, on the under surface of bone, in the central medulla, over or under the periosteum, as in some simple fractures. They are found in abundance on the surface of young growing bones, while on the surface of matured healthy bones they are absent, or very few in number. They are found in the immediate tissue lining the Haversian canals in natural healthy bone, owing to the constant interstitial change which goes on till after middle life.

On irritation of bone these round cells accumulate in such numbers in the connective tissue lining the Haversian canals that compression of the vessels would quickly ensue and necrosis result from the cutting off of the blood supply, if two things, both probably the result of pressure, did not supervene. First, these cells are so pressed on that they travel in the direction of least resistance, and so congregate in large numbers on the surface of the bone; when the periosteum covers the bone it serves as a protecting limiting membrane, which supplies them with nutriment. Secondly, the calcareous wall

undergo rapid absorption, their place being taken by these round cells, which on the subsidence of irritation, are rapidly converted into osseous tissue.

When a matured healthy bone is subjected to irritation, cells are poured out under the periosteum. As the irritation continues the periosteum becomes hyperæmic, much softer, and more swollen than usual, and the meshes of its under stratum become loaded with osteoblasts. Ossification may then proceed on the surface of the bone, where it is often deposited in irregular nodulated masses.

By way of conclusion, it may be stated that a study of the whole subject, from histogenesis to experimental inquiry and pathological observation, shows that bone is produced and regenerated by proliferation of osteoblasts, and its development and reproduction can take place independently of the medulla and periosteum. The periosteum acts as a sheath, as a protecting limiting membrane, through which the bone receives some of its blood supply, a very important portion being provided by the nutrient vessels. The cells of which the bone is composed are capable of living, separated from periosteum and medulla; they possess the power of proliferation, and consequently of regeneration of osseous tissue.

These conclusions, if accepted, indicate to the surgeon the value to be attached to the various elements, entering into the formation of bone. While not underestimating the periosteum, as a medium through which blood vessels reach the bone, and as a limiting and protecting membrane, of great use in many pathological conditions, he will no longer regard it as the structure which can secrete or reproduce bone. He will not trust the periosteum to regenerate bone unless it has adherent to it sound osseous plaques, the elements of which have the power of proliferation, and from these alone can osseous regeneration proceed. He will not discard injured osseous tissue under the belief that it must necessarily die, merely because it is divested of periosteum; but he will regard it as a tissue, possessed of great independent vitality, which, if placed in suitable media, where blood serum is plentiful, and where blood vessels can quickly be thrown out, is capable of living and growing. With that belief limbs, which otherwise would be sacrificed, may be saved.



A CASE OF FRACTURE AND DISLOCATION OF THE ASTRAGALUS.<sup>1</sup>

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SURGEON TO BELLEVUE AND PRESBYTERIAN HOSPITALS

A MAN about twenty-eight years of age, in a fit of drunken delirium, jumped from a third-story window, and was brought to Bellevue Hospital April 27. I saw him the next morning, about eighteen hours after the accident. There was a large bruise below the right patella, a row of abrasions along the left shin, and a small bruise below the left patella. The left foot and the lower half of the leg were swollen and discolored, the foot was at right angles to the leg, and was capable of some flexion and extension without deviation. A marked prominence was present at the inner side of the ankle, over which the skin was tightly drawn and was livid; it was at first supposed to be the internal malleolus, and the foot seemed to be carried bodily to the outer side, but on palpation the prominence was found to be behind and a little below the malleolus, and to have a curved border running backward and outward. Below this border could be felt a broad surface, that was curved backward and inward, and was flattened in a direction downward and inward; in front there was an abrupt depression. The scaphoid was in its normal location with regard to the malleolus, and no depression could be felt behind it in the situation of the head of the astragalus, although the swelling was such that the examination was not deemed very trustworthy. The peroneal tendons were displaced forward, so as to lie upon the outer surface of the external malleolus. The relations of the fifth metatarsal, cuboid and calcaneum appeared to be normal. The dorsalis pedis artery was beating, but the posterior tibial could not be felt. The diagnosis of fracture of the neck of the astragalus, with dislocation backward and inward rotation of the body, was made, and an attempt was made to reduce under ether, by flexing the knee and making downward traction upon the foot, and pressure outward and forward upon the projection behind the internal malleolus. This failing, an incision three inches long was at once made backward and downward from a point in front of the malleolus, its center corresponding to the most prominent part

<sup>1</sup>Read before the New York Surgical Society, May 11, 1887.



of the projection. The upper articular surface and the outer edge of the astragalus presented in the wound, and the body of the bone was found lying below and behind the malleolus, its broken neck being directed forward and inward, its upper articular surface looking inward and downward, its posterior border close to the tendo Achillis, and its inferior surface just behind and below the posterior border of the end of the tibia. A transverse fracture had taken place at the junction of the body and neck, and the body had been completely dislocated backward and inward, with rotation inward of about  $120^{\circ}$  about its antero-posterior axis, and of about  $45^{\circ}$  inward about its vertical axis. The tendons of the tibialis posticus and the flexor longus digitorum were torn from their sheaths and crossed the inner surface of the malleolus above the astragalus. The posterior tibial artery was pressed backward, and was separated from the tibia by the interposed posterior portion of the body of the astragalus. Exploration of the joint showed that the head of the astragalus was in place, and there was no injury to the tibia or fibula. The lower tibio-fibular joint was not injured. The fracture ran from the anterior border of the trochlea downward into the groove occupied by the interosseous ligament. The body was easily removed, as all its ligaments and connections had been ruptured, except a part of those attached to its posterior border. The wound and joint were thoroughly cleansed, the incision was loosely closed with two silk-worm gut sutures, a drainage-tube being inserted, the foot and lower part of the leg were enveloped in iodoform and bichloride gauze, and a plaster-of-Paris bandage was applied over all. On the following day the patient's alcoholic symptoms were much less marked, and his condition was good. On the third day a fenestrum was cut and the tube was removed; the wound was dry, the swelling had diminished, and everything looked favorable, but three days later he developed pneumonia, and died on the ninth day after the accident.

To this record of the case I beg leave to add a brief mention of the few similar cases that have been reported. They are those of Denonvilliers, Lejeune, Pichorel, MacCormac, Le Gros Clark, and Cheever. In the first two the dislocation was directly backward, in the others backward and inward, as in the present case. Of Denonvillier's case I have only the brief notes given by Malgaigne, viz., the body of the astragalus crossed the calcaneum at right angles, and its trochlea appeared through the skin below and behind the internal malleolus; he removed it, but the patient died. Of Lejeune's and

Pichorel's cases the quotations by Delorme ("Dict. de méd. et de chir. prat.," vol. xxvii, p. 643) and Poincot (Transl. of Hamilton's "Fractures and Dislocations") are even more brief; of the former it is only said that the dislocation was compound, of the latter that after two unsuccessful attempts at reduction, including division of the tendo Achillis, suppuration ensued and the limb was amputated. MacCormac's patient ("Trans. of the Path. Soc. of London," 1875, vol. xxvi, p. 174) was injured by the fall of a platform; the character of the injury was not recognized, and, after rest in bed for some weeks, he was able to walk well and to continue his occupation as a brick-layer. Two years later MacCormac removed the leg because of disease at the knee, and made a careful dissection of it. The foot was stiff, and was at a right angle with the leg without deviation. The astragalus had been broken at the neck, and the body had been so displaced and rotated that it lay behind and a little to the inner side of the tibia, its trochlear surface looking inward and backward, its posterior border being in contact with the tendo Achillis, and its broken surface looking downward and forward. The internal malleolus had been broken and had reunited, and the astragalus was connected with it by bony union. The tendons of the tibialis posticus and flexor longus digitorum were displaced inward and forward, lying on the inner surface of the malleolus; that of the flexor longus pollicis was separated from the tibia by the body of the astragalus, and lay upon the trochlear surface of the latter. No mention is made of flexion of the great toe, such as existed in Cheever's case, and in two others in which the unbroken astragalus was displaced backward and inward, but one of the accompanying figures shows the terminal phalanx flexed. MacCormac reports also a case treated in 1863 by Le Gros Clark, which he himself had an opportunity to examine twelve years later; he found the body of the astragalus identical with that of his own case, and supposed that there had also probably been fracture of the neck. The patient had full use of the limb, walking without lameness.

Cheever's patient (*Boston Med. and Surg. Jour.*, vol. xciii, 1875, p. 237), a man thirty-two years old, was injured by a fall of about twelve feet. There was a very marked, partly

rounded, partly sharp projection of bone between the inner malleolus and the heel, and a depression beneath the outer malleolus. The tendo Achillis was tense, and was shortened over the abnormal prominence of bone, which lay between the inner ankle and the heel. The heel was drawn up, and the mobility of the ankle joint was greatly diminished. The last joint of the great toe was strongly and immovably flexed at a right angle. After failing to reduce by traction under ether, he divided the tendo Achillis, then the tendons of the tibialis anticus and posticus, then that of the flexor communis digitorum, and finally the tendon of the flexor longus pollicis at the toe, but the dislocation still remained irreducible. The skin sloughed over the astragalus, but did not expose it, and the ulcer soon healed; in seven weeks the patient could freely move the foot, and in five months could walk with a cane. The divided tendons appeared to have united firmly.

The histories do not make clear the mode of production of the fracture and dislocation, but it seems probable that they occur while the foot is in dorsal flexion and by the agency of external violence, acting in the direction of the long axis of the leg along the sloping articular surface of the calcaneum, and forcing the tibia and calcaneum closer together, so that the posterior part of the astragalus is squeezed out from between them.

In my case, the bruises upon the front of the knees and legs indicate that the patient struck upon his feet with the ankles in dorsal flexion.

## EDITORIAL ARTICLES.

### RECENT CONTRIBUTIONS ON THE SUBJECT OF TUMORS.

1. Beiträge zur Statistik der Mamma Carcinome der Frau. Von Dr. Hildebrandt. *Deutsche Zeitschrift fuer Chirurgie*, Bd. XXV; Hft. IV u. V. (Contributions to the Statistics of Mammary Carcinoma in Women).
2. Zur Statistik der Mamma Carcinome und deren Heilung. Von Dr. Hans Schmidt. *Deutsche Zeitschrift fuer Chirurgie*, Bd. XXVI; Hft. I. u. II. (Upon the Statistics of Mammary Carcinoma and upon Recovery Thereupon).
3. Sarcoma of the Female Breast. By Prof. S. W. Gross, M. D. *The American Journal of the Medical Sciences*, July, 1887.
4. Ueber Maligne Neurome und das Vorkommen von Nervenfasern in denselben. Von Dr. F. Krause (Halle). *Samml. klin. Vorträge* (Volkman), No. 293 and 94. (On Malignant Neuromata and the Occurrence of Nerve Fibres in the Same)
5. Pathogenesis (Histogenesis und Aetiology) der Aneurysmen. Von Prof. Dr. Hans Eppinger. (Graz). *Archives fuer klinische Chirurgie*, Bd. XXXV und Supplement. (The Causes and Method of the Development of Aneurisms).
6. "Die Malignen Tumoren der Gefäßscheide." Von Dr. Carl Regnault. *Archiv. fuer Chirurgie*, Bd. XXXV, Heft i. (Malignant Tumors of the Blood-vessel Sheaths).

The subject of carcinoma of the mamma and its permanent cure forms the subject of two excellent statistical papers from the clinics of Berlin (Küster) and Göttingen (König). The authors, assistants at these clinics, have collected the material from 1875 to 1885. In the first paper, by Hildebrandt, the subject of discussion is considered more widely in a clinical way. In the second paper (Hans Schmidt) the protection assured to the patient by radical extirpation of the growth with clearing of the axillary region is closely analyzed.

Hildebrandt tries to make his statistics conform to the general plan laid out by Volkman and Sprengel, and, while considering minor points, he pays especial attention to the operative results as to return or permanent eradication. The two papers in certain points can well supplement each other.

Hildebrandt has found little to discuss in the mode of living and surrounding circumstances of his patients. In these respects cancer of the breast acts like that of other organs. The peculiar constitution

of the organ itself may in some way be favorable to the development of the disease.

Of 136 cases, 45 were between forty and fifty years, and 47 between fifty and sixty years, double the amount that occur in the preceding or succeeding decades.

Fifty-one of the above cases were between forty-five and fifty-five years of age. The gland at this time is going through anatomical and physiological retrograde changes. The influence of the menopause on the occurrence of cancer is not ascertained. Of 132 cases 85% were in married women; this figure corresponds to that given by Winniwarter, Oldenkop, Sprengel and Henry.

In 55 cases, where the fact has been noted, 46 have borne children, and of these four did not nurse. In exceptional cases the growth increased rapidly during pregnancy. In others the tumors appeared during lactation. After weaning a nodule remained in the breast and attracted attention. In some cases the affected breast had been nursed more; in others the opposite fact had been recorded. Altogether, the cases were too few to draw satisfactory conclusions as to the above points. Altogether, sexual and physiological processes and the changes induced in the breast make this gland a fertile ground for the development of abnormal growths. Though König makes a trauma a predisposing moment for the development of carcinoma in scattered cases, analysis of a set of cases gives us no positive support for such theory. In some cases eczema of the nipple had a long time pre-existed. Hildebrandt does not go into hereditary details.

As to seat of the disease the left gland was as frequently affected as the right. The situation of the tumor in the gland had no influence on the time of infection of the regional lymphatic glands. Of 152 cases, 29 were free from such infection. In 94 cases the skin was free from the growth. The skin became in many cases only affected later in the disease.

The average duration of the tumor without any affection of the lymph glands and skin was  $8\frac{3}{4}$  mos. Without affection of the skin alone  $9\frac{3}{4}$  mos. Lymph glands were affected on average, the skin being free, after 11 mos. Both skin and lymph glands found affected,



on average of  $13\frac{1}{2}$  mos. As with skin so with muscle, they become affected later. The pectoral fascia forms a sort of barrier. The fascia itself owes immunity to the peculiar construction of lymph spaces here.

In 152 cases 11 were scirrhus, 5 medullary and the rest of the ordinary variety of carcinoma.

Metastases were found in the lung (8), the liver (7), stomach (4), mediastinal glands (2), spleen (1), kidney (1), uterus (1), vertebral column (1), general carcinosis and internal metastases (9). Of 152 cases, 137 were operated on in the radical way as described in König's handbook. The amputation of the breast with the clearing of the axilla of glands and the infra- and supra-clavicular space is to be recommended. In cases where the tumor was benign this was not done. The incisions are made far into the healthy skin, and the author recommends in certain cases the advisability of Helferich's method of forming a skin and muscle flap from the pectoralis. By the latter method all fat tissue becomes apparent to the eye as well as touch, and it is to be adopted in cases of extensive glandular affection.

In König's clinic the mortality was 7.2%. All cases above 55 years died from pneumonia subsequent to the operation. Until the year 1880 mortality was 10%. Antisepsis has reduced this to 5% in the last five years.

Erysipelas complicated the convalescence of some cases where the axillary glands were extirpated, but rarely proved fatal.

If a return of the disease occurs, from our present knowledge it is rational to suppose that in some way the operation was not complete as to the extirpation of affected lymphatic tissue. In cases where return of the disease occurred (65) the growth appeared in the form of nodules in and beneath the skin (soon after operation). Also in the axillary or clavicular glands. (Ineffective operative measures). If the second mamma became affected, it could be rarely traced to the first as a cause.

The returns were observed mostly within six months after operation. If after three years no return has been observed, we may hope that the cure has been complete (Volkman). Of 102 cases collated by



Hildebrandt 23% may be called cured; but even here we must reject unobserved cases, which leave 21.7% cases permanently cured in the clinic of König.

(2) Doctor Hans Schmidt (Küster's clinic) presents us with 228 cases, being those operated on in the Augusta Hospital, Berlin, from 1871 to 1885.

In most cases the patients were operated on early, so that cases of inoperable character were not common.

In all cases the axilla, infra- and supra-clavicular regions were searched for glands, also the sides of the neck. The following results were obtained.

Of 163 cases diseased glands were found 158 times. In 3% cases no glands were detected. In 71% cases the affected glands could be diagnosed before operation. Lastly, in 26.25% cases glands were found at the operation which had not been diagnosed before incision. From the last observation it can be seen how little safety simple palpation gives against the disease of the axillary glands.

All the cases were operated on according to the Küster and Volkmann method. It was particularly important to avoid the injury of the subscapular nerve, else the patients would in days subsequent to operation show an inability to raise the arm.

The dressings were, as a rule, left on for twelve to fourteen days until the wound was thoroughly healed. If discharges appeared after two to three days a second dressing was applied over the first. A foul secretion or temperature alone indicates removal (sepsis).

Mortality from 1871 to 1885 was 10.8%; from 1883 to 1885, 5.2%. In 1885, 2½%.

Causes of death were: Sepsis, brown atrophy of the heart, embolism of the pulmonary vein, broncho-pneumonia. According to Küster, if cases remained free from a return of the disease for three years after operation they were considered cured. Even here there is, as in other diseases, a chance of return.

If, on considering his 228 cases those are deducted which were inoperable (6), and those dying as result of the operation (24), there remains 197 cases to consider. To pass upon the possible complete

and radical cure only those cases operated on since 1882 are considered. Of 93 such cases, 20 cures remain, 21.5% who remained free from return of disease for three years and over. 26.4% are free for two years from return.

In cases where return occurred it was observed mostly in the skin cicatrix, muscle, sternum, other mammary gland, ribs, pleura, metastases in other organs, the glands of the neck, infra- and supraclavicular regions, and finally one case where the return occurred in the axillary gland.

The whole paper tends to support certain dicta of Prof. Kiister.

The typical removal of the axillary glands is an essential step in extirpation of the mamma, aside from the fact whether before or after division of skin glands are felt in axilla.

The above assures a better result as to return of disease; with the antiseptic methods it does not increase the danger of the whole operation. The typical removal of axillary glands should be done as soon as the diagnosis of malignant disease is established. If, after extirpation, a tumor is proven microscopically carcinomatous, the axilla should immediately be searched for diseased glands and cleared. Benign tumors can be simply extirpated with retention of rest of the mamma.

The subscapular nerves should be protected from injury and the arm of affected side left in the fixed dressing only 24 hours. The permanent antiseptic dressing and uniform compression, and leaving the bed early after the operation, are essential factors. We have in the early operation of the carcinoma and the simultaneous removal of the regional glands a method by which it is possible to permanently relieve a considerable class of cases of the disease.

(3) Dr. S. W. Gross, in a paper based upon a study of 156 cases, finds that of the varieties of sarcoma, the spindle-celled, which include the fibrous, constitute 68%, the round-celled 27%, and the giant-celled 5% of all cases.

Of the entire number only 4, or 2.70%, occurred before the sixteenth year, or during the developmental state of the mamma; 67, or 45.27%, appeared between the sixteenth and fortieth years, or at a

period when the breast and genitalia are functionally most active ; and 77, or 52.02%, after the fortieth year, or during the period of their functional decline. Their etiology is most obscure, since their development is rarely traceable to injury or disease, and is not influenced by hereditary predisposition, while the social state and menstrual irregularities or arrest are surely unimportant agents in their production. Their growth might naturally be expected to be connected with menstruation, pregnancy, or lactation, or with conditions which render the mammary gland more vascular ; but the influence of an increased flow of blood to the organ, which has been assumed by certain authors, is not confirmed by an analysis of the cases that he has collected. Thus, in only three examples was an increase in bulk witnessed at the menstrual period, while in two the tumor became smaller. In one the rapid growth began during pregnancy, and in two at the menopause.

During their further progress sarcomata continue, as a rule, mobile and free from superficial or deep attachments ; the contiguous structures are not invaded by tumor elements ; the skin remains natural in color and texture ; the subcutaneous veins are not enlarged, the nipple is normal ; and the associated lymphatic glands are not contaminated. To these general statements the following exceptions were noted.

They are locally infectious in 14.19% of all cases. The skin is ulcerated in 18.59%, and discolored in 23%. The superficial veins are enlarged in 15.39%. The nipple is retracted in only 3.25%. The axillary glands are infected in only 1.9%, and their immunity is a valuable sign in the differential diagnosis. A discharge from the nipple occurs in one out of every nine and a half of cystic sarcomata. Pain is met with in 35.71% of all cases.

Sarcoma is eminently malignant. Thus, of the 92 cases only 1 ran a natural course, it being an example of round-celled tumor of both breasts, that proved fatal, with presumed secondary deposits, in seven months from the first appearance of the disease. The remaining 91 were subjected to the knife. Of these, 32 were well for periods which varied between one month and ten years and nine months ; 42 were marked by local recurrence ; in 8, not only was there regional reproduction, but metastases were found post-mortem ; 3 recurred, with

unmistakable evidence of general dissemination; 4 were characterized by metastases, and 2 by presumed metastases, without recurrence. In other words, 64.83% of these cases were endowed with malignant features.

Of the 53 cases in which the disease recurred locally, in more than one-half, or 57.7%, the return took place in six months, while after 12 months there were only 13, or 28.8%, and of these there were only 4, or 8.8%, after 2 years. These statements lead to the belief that the chances for the patient are relatively good after the lapse of 2 years, and that the prognosis is all the more favorable as the period of freedom from signs of local contamination prolongs itself. As the latest date of reproduction was 4 years, it may be assumed that the 12 cases which remained well after the lapse of that time were permanently cured. The average date of recurrence was  $10\frac{1}{2}$  months, and the total life of these patients from the first observation of the disease to the final report after the last operation was 7 years and 9 months. The number of recurrences, or operations for recurrence, was 1 in 23 cases, 2 in 13 cases, 3 in 7 cases, 4 in 1 case, 5 in 4 cases, 6 in 2 cases, 7 in 1 case, 12 in 1 case, and 22 in 1 case.

Sarcoma is less infectious locally, but more infectious as regards the general system, than carcinoma. Its more relatively benign character is shown not only by the larger proportion of cures, but also by the fact that the average duration of life, from the first observation of the disease to the date of the last removal after operation, is forty-two months longer; and this contrast becomes the more striking when it is stated that the majority of the sarcomatous patients were still living, and the majority of the carcinomatous subjects were dead.

Not only is this statement true for sarcomata in general, but it holds good for the three varieties, since the average life for round-celled sarcoma is fifty-four months, ninety months for the spindle-celled, and one hundred and eight months for the giant-celled.

The treatment may be summed up in a few words. The entire breast, along with any skin that may be invaded, must be extirpated, especial care being paid to the complete removal of every particle of paramammary fat and the fascia of the pectoral muscle, in which tissues

experience shows that recurrence takes place. In the event of repululation the growths should be freely excised as fast as they appear, as such a practice not only prolongs life, but may bring about a final cure.

(4) In an exhaustive brochure on malignant neuromata (false neuroma) and the occurrence of nerve fibres in the same, Dr. Fedor Krause has presented the subject both from a clinical and histological standpoint. His conclusions are drawn from a set of cases observed in the clinic of Volkmann. Though scattered cases of neuromata are recorded in literature, their consideration can hardly be said to be complete.

Virchow, Von Recklinghausen among pathologists, and Volkmann, Bardeleben, Stromeyer and Küster, among the clinicians, have described these tumors. The author has collected twenty-seven cases in the literature of clinical interest; these include three of his own. These tumors do not simply include those occurring in amputated stumps and cicatrices, but those of traumatic and spontaneous origin which are found in the course of the large nerve trunks or their smaller branches. They are closely adherent to the nerves, and seem to involve the nerve fibres in their growth. The nerves seem to pass through the tumors or around them to one side.

As far back as 1803, Odier first described tumors which seem to correspond to those the subject of this monograph. It remained for Virchow to place their histology on a firmer basis. Volkmann in a case published by him first pointed out the probable relationship of these neuromata to the malignant tumors. (Sarcomata). These neuromata occur more especially on the larger nerve trunks of the upper and lower extremities, though the very small cutaneous branches are not exempt from their occurrence. In the cases so far recorded the median in the arm, the sciatic in the thigh and the median in the forearm have been the seat of these tumors in the above order of frequency. They vary in size from the smallest dimensions to that of a child's head. They are adherent, as mentioned above, to the nerve trunk. Their shape may be oval, round and nodular; elastic or hard in consistence. They may be single, in other cases multiple, involv-

ing the principal nerve trunks. The adjacent structures, periosteum of the bones and muscle, in some cases, become involved in the growth of the tumor. The tumor may be movable through the unbroken skin, in a direction transverse to the course of the nerve trunk. Both sexes are equally liable to its occurrence, and no age has been found exempt from the malady. Heredity in one case seemed to have played a role where both mother and daughter were affected with these tumors. The etiology is equally obscure, though a trauma was present in some cases.

The growths increase rapidly in size, and after extirpation we have marked and rapid returns of the tumors. Once subjected to pressure, they act like malignant growths elsewhere and undergo necrotic changes, with subsequent hemorrhages. It is surprising to note how much compression a large nerve will undergo from one of these growths (case of author, median nerve), and yet the most careful examination will fail to find any change in the electrical reaction from the normal.

The symptomatology of this class of neuroma is not so clear as to enable us to make a diagnosis in all cases. For the symptoms on the part of the nervous system may be prominent or quite obscure or absent. Pain and abnormal sensations (formication, tickling sensations) have been observed in some cases as first symptoms. Shooting pains in the course of the affected nerve, a subjective feeling of numbness, and objectively a diminished sensibility have been noted. If the muscular branches are affected the patients complain of weakness and in some cases actual paralysis may result. Of greatest moment must be the nervous phenomena to be observed in the course of some special nerve trunk before the actual presence of the tumor is suspected. The tumor in one case of the author appeared as a nodular growth on the radial side of the metatarsal bone of the right hand on the palmar surface. In another the growth followed a trauma and appeared along the course of the median nerve in the axilla. In a third case the tumor was of slow growth and appeared on the calf of the left leg, attaining the size of a child's head.

*Histologically*, these tumors should be classed among the sarco-



mata. round or spindle-celled, with a varying amount of intercellular substance. The cellular growths are seen in an early stage to begin in the perineurium (Key and Retzius) of the nerve trunk. Increasing in extent, they gradually involve also the intra-fascicular connective tissue of the nerve. Growing as they do in and along the connective tissue lamellæ of these structures, the tumor in time involves the nerve fibres. The fascicles of the nerve trunk are pressed apart, and on section a pinkish gray tumor mass is seen to be traversed by whitish strands in the original direction of the nerve. Some of these fascicles are unchanged. If others are examined microscopically, it is seen that the sarcomatous elements have also pressed the primitive nerve fibres apart. There is under the microscope the picture of a labyrinth of nerve fibres (medullated) traversing a collection of spindle and round cells. In these places the author has concluded from an actual comparison of sections of the healthy nerve and those of the tumor that an actual *increase of medullated nerve fibres* has taken place. This perhaps might in some way be caused by the activity of cellular growth in the tumor.

Non-medullated nerve fibres seem to exist in these tumors. Their presence might be accounted for, in part, in the following manner. As a result of pressure of the tumor mass, the axis-cylinder of the nerve fibre becomes much swollen, the medullary sheath gradually disappears. The axis-cylinder alone remains. The latter does not stain with Weigert's method (hematoxylin), which was made use of in this work. Kahler, by injecting melted wax into the spinal cord of rabbits, has caused similar results in the axis-cylinder of the nerve fibres of the cord.

The prognosis in these growths must, on the whole, be looked on as unfavorable. The outlook is more serious in those tumors where the intercellular substance approaches the type of mucous tissue (myxosarcom). In the harder tumors (fibro-sarcom) a return has resulted of tumors approaching the mucous type.

The time which must elapse after extirpation before the patient can be considered safe from a return of the growth varies. In one case the patient was free from symptoms for six years, and then a return

was noticed. Nor does the return necessarily occur in the old cicatrix, but tumors may appear in the healthy part of the nerve trunk. After complete extirpation return has been the rule: in some cases amputation or disarticulation of the affected extremity had to be resorted to. In other cases, even after such radical measures, the tumors have reappeared in the nerve roots of the spinal cord and caused pressure effects.

From the above it will be seen that the therapy must vary in different cases. If the neuroma is centrally situated on the nerve trunk, a resection of the nerve is proper. Enucleation of the tumor can only be thought of where the tumor is situated on the side of the nerve and surrounded by a distinct capsule.

Multiple tumors closely adherent to adjacent parts (periosteum) would point to amputation. In the latter case exploratory incisions should be made above the amputation limit, along the course of the nerve trunks, in search of small grayish pink nodules on the same, where after extirpation repeated return of the tumors, results amputation is the best course, and even this does not insure against future trouble.

In closing it must be remarked that not only are the clinical conclusions valuable, but the histological work of this paper is one of excellence, conducted, as it was, under the guidance of Prof. Weigert, of Leipzig.

5. The thirty-fifth volume and supplement of Langenbeck's Archives contains in itself a very exhaustive contribution to the literature of the pathogenic histogenesis of aneurysms. The author, Prof. Hans Eppinger, of Graz, has in this work embodied the result of a series of investigations stretching over a period of years. The views expressed are in some respects original and will meet much criticism.

The work first considers the nomenclature of aneurysms and what is known of their pathogenesis (histogenesis and etiology). The author then departs into a classification of aneurysms according to their pathogenic histogenesis into (1) the congenital aneurysms, (2) the parasitic aneurysms, (3) the simple aneurysms (traumatic). From the vast literature and schemas of the subject of aneurysms, Prof. Eppinger has

selected that of O. Weber as being the least objectionable in a pathological standpoint. Without going into lengthy detail we have only space to say that Prof. Eppinger conceives no such distinction as that of true and false aneurysms. Logically an aneurysm must be such in a pathological sense. We cannot speak of false carcinoma, and therefore not less consistent is it to speak of false aneurysms. Thus it must be seen that Prof. Eppinger confines his conception of an aneurysm to those structures included only under Weber's *aneurysma spontanea et vera*—all arterial ectasic varix and the so-called sacciform and dissecting varieties are excluded, as also all the false forms (*hæmatoma* circumscribed and diffused) and the arterio-venous aneurysms. The aims of pathological unity would certainly be favored if such a view were accepted. Clinically it has been hitherto found convenient to classify certain conditions (rupture of arteries and formation of sac) as false aneurysms. To-day scientific advances demand greater simplicity, and in this way may be attained the true combination of the teachings of pathology and the bed side. The author has endeavored to give us a true contribution to the pathogenesis of aneurysms. The views are so novel, and differ so from those now current that we will endeavor to clearly outline them. Under congenital aneurysms, the author classifies those formations found in the course of arteries described by Kussmaul and Maier in their work on *periarteritis nodosa*. He has himself observed two cases of this very rare condition, one in a child æt. 10 years (coronary arteries). In this condition a series of sections and study of the same proved that a *periarteritis* in a true sense does not occur. In all the affected vessels there was found a congenital defect of the elastic coat, the intima and the adventitia being intact. The muscularis in some cases may be found stretching over the cupola of the aneurysm in the course of the artery. In all cases the elastica terminates suddenly at the entrance to the aneurysmal sac. There is no *endarteritis*, no sclerotic changes but a *tear defect* (congenital) of the elastica which paves the way to aneurysmal formation.

The intima may be somewhat thickened but the general conclusion remains as above.

Syphilis (Rokitansky, Eichler, Baumgarten, Virchow) cannot be looked on as a predisposing agent.

By far the most interesting portion of Prof. Eppinger's work lies in the contribution to the literature of *mycotic endocarditis* and the aneurysms found in connection with this disease. These aneurysms are discussed under the heading of parasitic aneurysms or aneurysms of mycotic-embolic origin (mycotic-embolic aneurysms). In mycotic endocarditis, small particles, containing myriads of parasites, become detached from their valvular seat. They are carried into the general circulation and the formation of embolism and thrombosis of a *mycotic nature* ensues. Already an immense bacteriological literature has amassed itself on this subject alone. Dr. Osler who has had an extraordinarily large number of cases of this nature has gone as far as any one, both clinically and pathologically to prove the mycotic nature of these processes.

Prof. Eppinger goes a step further to prove that aneurysmal formations found on arteries in this disease (malignant endocarditis) are of mycotic origin, and not, as formerly thought, the results of simple arteritis. This mycotic embolism and thrombosis is found mostly at the point of division of an artery, and no artery has escaped their formation. Once arrested in the lumen of the artery, these myriads of streptococci and staphylococci set up irritation in the wall of the artery as they have done in the tissue of the endocardium (valves, etc.). Inflammatory exudative changes begin in the adventitia (periarteritis acuta) progressing toward the intima. The integrity of the media is disturbed (mesarteritis) and the elastica bursts. If the process goes on rapidly miliary hæmorrhages occur, if less rapidly aneurysmal formations. Multiplicity is a characteristic of these processes, and all arteries from the smallest to the largest may be affected. In all cases the elastica is compromised at the junction of the aneurysm with the lumen of the vessel. The muscularis may or may not be affected. As shown above the favorite point for development of these aneurysms is the dividing point of a vessel. In the acute cases the mycotic emboli are found to be adherent to the point of entrance of the aneurysm. In chronic cases this link in the chain of evidence is

generally lost. The author proposes for this special class the name of mycotic-embolic aneurysm. It is to be regretted, however, that Prof. Eppinger has confined the technique of his work to the staining and study of hardened sections. In no case was the domain of pure bacteriological cultures and control experiments on animals entered upon. The author would classify among the above class of aneurysms (parasitic) those aneurysmal formations to be found in arteries running in the walls of tuberculous cavities of the lung. These aneurysms are fully described in the literature (Fraentzel, Mayer, Ziegler, Weigert, Orth). The latter has found in the walls of such arteries numerous tubercle bacilli with the presence of tubercle tissue. The histogenesis of this aneurysm is the tubercle bacillus. The bacilli invade the adventitia of the vessel penetrating even through the media. Through their activity the layers of the adventitia and media become infiltrated with tubercle tissue. By an erosion process the wall of the artery looking toward the interior of the cavity becomes thinned. It being now the seat of tuberculous changes and hyalin degenerations, the intima becomes thickened. Now the artery may, in its lumen, become obliterated or the elastica being compromised and the thickened intima having lost its resistance capacity, aneurysmal bulging and aneurysm results.

In the concluding chapter the author discusses the histogenesis of the simple aneurysm. (*Aneurysma simplex traumaticum*). The term traumatic being misleading this is omitted and the old nomenclature adhered to. Prof. Eppinger has been content here to compare the mechanical theory (Virchow, von Recklinghausen) and the inflammatory theory of chr. endarteritis (Rokitansky, Kuster) by the light of his own studies. He concludes that the simple aneurysm has a mechanical pathogenesis (etiology), though every trauma does not lead to aneurysm. The intima may alone be compromised and perfect healing result. Where the media has been affected this has resulted in restoration. The elastica, however, once torn an aneurysmal bulging of the vessel results. This may occur in perfectly healthy arteries or in those the seat of atheromatous processes.

A vessel may be the seat of extensive chronic endarteritis with contractions and cicatrizations but no aneurysm result. On the other

hand if aneurysms be found in such vessels it does not follow that the inflammatory changes have been an etiological factor.

6. In this clinical study of the malignant tumors of the sheaths of bloodvessels the author has collected 18 cases occurring in the literature. Some of the cases were operated on in Czerny's clinic, Heidelberg. Of these 18 cases there were 14 sarcomata and 6 carcinomata. Carcinomata of the sheaths of bloodvessels are very rare. The etiology is obscure. It is to be noted that severe pain is the first symptom at the seat of development. In other respects the points of difference from sarcomata apply here, as in other tumors, in other regions. The sarcomata are myxo-fibro-, melanodes, fuso-cellulare, globo-cellulare, giganto-cellulare and mixed forms. They may be soft or hard, the latter being the common form. In one case a sarcoma existed in the wall of a cyst in the sheath of the vessel. In some cases it is not possible to determine whether the tumor has originated from the tissue of the sheath or the neighboring lymphatic structures. In some cases (3) there was a distinct traumatism as an exciting cause. Age plays no important role. In twelve cases of sarcomata the ages varied from 20 to 50 years. In one case the patient was aged 13, another 71. Six carcinomata occurred in 40 to 50 years. These figures are too few for valuable conclusion. The development of sarcomata varies from 4 weeks to 6 years. There is no case mentioned of arrest of growth.

As to diagnosis, the tumors are found in the large vessels of the neck, arm, thigh and popliteal space. Carcinomata occur almost exclusively in the neck. The tumors present an ovoidal shape along the course of the vessel. In the arm beneath the fascia they are less movable than when the tumor has broken through and lies above this structure. In the neck and axilla they are slightly movable, fascia being thin here. When uncovered by fascia the tumors appear irregular and nodular in shape. The situation of the vessel alongside the tumor aids the diagnosis. But the vessel in all recorded cases was not found, it being pushed aside. In one case the tumor diminished the lumen of the vessel, causing a murmur. Veins are narrower in most cases. In others they are thrombosed. Clinical symptoms of this latter accident are absent on account of a free collateral circulation. The diagnosis from aneurysm is difficult in some cases.



The safety of the patient lies in complete extirpation of the tumor. It may be necessary in some cases to resect both artery and vein. In others ligation is resorted to for hemorrhage. Where the tumor involves Hunter's canal the safest procedure is amputation. In more favorably-situated tumors the vessel may be exposed above and below the growth, ligatures passed so that should the vessel be wounded during resection ligation may proceed immediately. In all cases it is well to prepare the mind of the patient for a possible amputation.

HENRY KOPLIK.

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OLLIER ON SIMPLIFICATION OF THE POST-OPERATIVE TREATMENT OF RESECTION OF THE KNEE.<sup>1</sup>

Professor Ollier's contribution with the above title contains scarcely anything really new to surgeons familiar with the use of iodoform dressings and with sublimate dressings, and also with the management of plaster of Paris splints; and, considering the number of times the first person (usually plural) is used, it is perhaps to be regretted that the names of other surgeons never appear in the memoir except as a preliminary to the demonstration of, in one case, an encroachment upon Professor Ollier's claims of priority, and in the other, a confession by Lucas-Championnière of his unwillingness to leave carbolyzed gauze dressings unchanged for more than a few days after excision of the knee. M. Ollier has, however, this excuse that so much has been done by so many other surgeons in every country of late years in the direction of simplifying dressings for excisions and other operations, that finding it impossible to make full acknowledgment to all, he may be right in doing justice only to himself.

"To thine ownself be true,

Thou canst not then be false to any man"

may be a precept applicable here, but it is a dangerous doctrine, and M. Ollier does not like it when followed by an English surgeon who contrived a method already published by himself.

Taken as a whole, however, M. Ollier's paper is one of great value,

<sup>1</sup> Memoir by Prof. Ollier in *Revue de Chirurgie* for August, 1887.

force and clearness. Nowhere could the surgeon find a series of rules for the execution and management of excision of the knee, which he could more safely obey and feel that he was doing in every or almost every respect the very best thing possible for his patient. Professor Ollier always does justice to his subject, and impresses one with the correctness and keenness of his judgment no less than with his ingenuity and inventiveness. From these preliminary observations we will pass to an analysis of the paper.

The difficulty of the post-operative treatment of excision of the knee is the cause of the immense variety of apparatus which have been contrived for the purpose by various surgeons. It has also in Ollier's opinion been one of the causes which have prevented the operation from taking its proper position in practical surgery. If this difficulty is shirked, great is the risk of failure of osseous union or of ultimate displacement of the bones, not to mention more serious dangers.

With antisepsis the question is simplified at once; the mortality once enormous, is now lowered, in non-complicated cases, almost to the vanishing point; but the orthopædic and functional results are not correspondingly improved. In fact, if the changes of dressings are frequent, these results may become worse.

Persuaded that the best way to ensure osseous union is to secure absolute immobility during all the time necessary to complete the process, Ollier sought for and found a dressing which would last forty or fifty days. This, he says, reduces the post-operative treatment of knee excision to extreme simplicity.

Before describing it, he recalls the chief points of his mode of operating (published in the *Revue de Chirurgie* in 1882). They consist, essentially, of the preservation of the lateral ligaments and of all the healthy parts of the periosteo-capsular sheath, *i. e.*, of all the tissues fitted to keep the bones in place and to accumulate around the line of union as many ossifiable elements as possible. This mode of proceeding is perfectly compatible with the removal and destruction of all the tuberculous elements in any case really suitable for excision. And by following it one can reckon on preventing those progressive

flexions and other secondary disorders which otherwise are apt to follow excision of the knee.

*A.—Mode of dressing intended to maintain permanent asepsis of the wound. Drainage through special latero-posterior incisions. Iodoform spread abundantly outside the wound. Value of osseous suture. Simplified appliances.*

Asepsis is the first essential. One case is mentioned in which the first dressing was left in situ for 52 days. The appearances are minutely described. They do not differ from those familiar to surgeons who leave their first dressings on osteotomies, for example, for two or three weeks. But it is worth noticing that the components of the dressing which had been soaked with blood or serosity were still moist on the posterior aspect of the limb, even as high up as the root of the thigh. This dampness must have been due to the fact that Mackintosh was used, and was probably not a desirable condition. But all's well that ends well. There was perfect union of the bone.

What are the conditions necessary to obtain such results? The two most important are: (1). The removal of all the infected tissues and parts calculated to cause infection. (2). The drainage of all dependent parts and of all cul-de-sacs in which infectious matters could accumulate.

"For this purpose we remove, in cases of fungous arthritis, all the diseased synovial membrane; we dissect out with care the sub-tricipital cul-de-sac and the lateral diverticula which may occur, and at the situations where a fibrous capsule or ligaments exist, we scrape away such fungosities as cover their internal surface; but we preserve the healthy part of the periosteo-capsular covering. As we always try to get osseous union (except in quite exceptional cases), we excise totally, and, when the tibia is almost healthy, we remove a thin slice of it to abolish the articular cartilage. As to the patella, as a rule, we remove it, and in exceptional cases when we have left it, we have, by a vertical cut of the saw, removed all its cartilaginous surface in order to have, not a sliding bone, but an adhesive surface."

Ollier's incisions form a quadrilateral flap with the base upwards and

the transverse cut at the lower end, passing over and dividing the ligamentum patellæ. The two lateral ones can be prolonged downwards, if necessary, so as to form the letter H. Thus can be preserved the lateral ligaments, which Ollier avers used to be divided by all surgeons until he adopted the opposite practice. He claims for them great value as elements in the preservation of the solidity of the synostosis. The incisions for drainage are two, and correspond to the posterior borders of the condyles.

In a foot note, Professor Ollier writes: "We reserve our vertical and median transpatellar incision for exceptional cases and in particular for traumatisms," and he points out that one of the authors of the "*Revue de Journaux*" does not appear to have suspected that he, M. Ollier, had described it five years ago. Now, it is perfectly true that M. Ollier did write a full and clear description of such an operation in the *Revue de Chirurgie*; but the description is so worded as to convey the idea that it had been entirely worked out on the dead subject and, if M. Ollier has ever published any operations of the kind on living patients, there is much reason to think they have escaped observation in this country. Accordingly, Mr. Herbert Allingham deserves some credit for having reinvented Ollier's vertical operation last year: and perhaps I have a right to claim a little for having actually done the operation on a living boy in the same year that M. Ollier first wrote of it. My operation was a few months subsequent to Ollier's article, but I certainly did not get the idea from him or his article. My case was the first knee free from *infectious* disease which I ever excised; and I dealt with it simply according to the first principles of surgery, one of which is that, in operating on the limbs, a longitudinal incision is almost always preferable to a transverse one.

However, I agree with Ollier and differ from Allingham in thinking that the median longitudinal incision is not suited for tuberculous knees, and I shall call the "vertical and median transpatellar incision" "Ollier's," for convenience sake, and because the great French surgeon's contributions to our art deserve every compliment that can be paid to him.

Ollier's incisions permit a mere operation of erosion to be performed

should the comparatively healthy state of the cartilages and bones prove that alone to be necessary. After the operation the ligamentum patellæ is sutured.

When there exist posteriorly masses of pulpy material in accidental pouches or in the bursa "of the internal gastrocnemius," a drain is inserted opening directly backwards. As a rule the postero-lateral drains make the former unnecessary. To prevent compression of the drain by the bones, the latter may be gouged to form a channel. The lateral drains have a calibre of 7 millimetres. The "tricipital" bursa should always be drained, except in the rare cases wherein it has become obliterated.

Ollier always inserts sutures into the bones and has long given up the use of nails. Of the latter he says that they are more rapidly and easily applied than the former, but that the friability of the osseous substance in certain forms of "fungous" osteitis prevents firm fixation by nails. With regard to material for the suture he says that plated iron wire is as good as any other. He takes care to include the periosteum and the fibrous layers which cover it within the suture.

According to the amount of friability of the bones, the wire is inserted 20 or 15 millimetres from the surface of the section. The wires are inserted laterally and a little anteriorly and fastened by twisting exactly four times on themselves. The exact number of turns must be remembered with a view to untwisting. When a great deal of bone has been resected, a couple of centimetres may be cut off the end of the large anterior flap of soft tissues.

Iodoform is dusted freely over the parts which are then wrapped in carbolic gauze, among the layers of which are scattered coarsely powdered or crystallized iodoform. The gauze is iodoformed with especial care near the root of the thigh, because the limb being placed with the foot high, the discharge gravitates towards the buttock.

Over all are placed a "complete" carbolized gauze dressing with Mackintosh or gutta-percha tissue.

The apparatus of fixation is a "demi-gouttiere" of muslin soaked in wet plaster-of-Paris, which extends along the posterior aspect of the limb from the toes to the groin. A sheet of unsized paper is inter-

posed between the plaster splint and the dressings and prevents them from adhering together.

*B.—Cases favorable to consolidation under a single dressing—Examples—Circumstances which necessitate removal of the dressing.*

The most favorable cases are those in which excision is performed before the appearance of fistulæ and infection of the articular cavity. Orthopædic resections are the most favorable of all.

Ollier considers iodoform the most certain and the most lasting antiseptic we possess, and that it secures best the permanent antisepsis needed. He therefore attaches the greatest importance to its employment.

By means of "immovable occlusion" with thick layers of cotton wool (of which the most internal were soaked in carbolic oil), supported by a silicated apparatus, he had already left under the same dressing, for thirty or forty days, compound fractures of the thigh and amputation stumps, but he had never succeeded with this plan in the case of excision of the knee.

With regard to the leaving the drainage tubes in situ for six weeks or more, Ollier does not trouble himself about them so long as the patient remains well and free from pain.

Even if a little pus should form, it is of no consequence provided there is free egress for it from the wound.

When the dressings are removed the union of the bone is not yet ossified, (a long time yet is required for that to take place, at least in some cases), but they form a continuous whole which permits the limb to be raised by the heel or by the toes. The cicatrization of the drainage tube holes is only an affair of a few days.

Ollier then contrasts his practice with that of surgeons who carry out to the letter "Lister's dressing," and takes M. Lucas-Championnière as a type. The latter writes that all his attempts to manage with very infrequent dressings have, except in the case of ovariectomies, hernias and small operations, led to very inferior union to that which he obtained by more or less changes of dressings.

Ollier is one of those who think that iodoform has changed all this.



Pedantic obstinancy is to be avoided. There are cases in which pain or rise of temperature demand a redressing on even the third or fourth day.

Elevation of temperature alone is not sufficient to require a new dressing, if there is no suffering and confesses distinctly to feeling all right. In one case in which a temperature of  $39.6^{\circ}$  was attained, the dressing was not changed till the seventeenth day. It is my duty to point out that M. Ollier advances no proof, except such as may be inferred from this very insufficient case, of the wisdom of the course he advocates. Does he really wish us to believe that a single change of dressing is likely to be so mischievous that it had better be avoided even when the temperature rises to  $103.3^{\circ}$  F. ( $39.6$  cent.) ?

In the case quoted, the temperature fell the next day to  $101.5^{\circ}$ . This was something to justify postponement of dressing; but as the temperature danced up and down for several days more, some people may accuse M. Ollier of having himself gone dangerously near to the "systematic" or red-tape practice against which he warns us.

Two cases are reported as examples. Their headings are as follows, respectively :

CASE I.—Tuberculous arthritis of the knee; many fistulæ penetrating into the joint.—Total resection of the knee.—First redressing on the fifty-third day.—Union of the femur and tibia already firm.

CASE II.—"Fungous" arthritis of the knee; fistulæ in the patellar tendon: sub-tricipital focus of granulations and pus.—Resection of the knee; multiple drains.—First dressing on the seventeenth day.—Femoro-tibial consolidation already advanced. Second dressing on the thirty-third day.—The patient went out four days afterward with a silicated bandage.

In the second case a curious circumstance was noticed, namely the formation of a new patella in the periosteal sheath which had been preserved. The new patella was obviously as broad as the old, but not so thick. It was somewhat movable on the femur.

Infrequency of dressings economizes the sufferings of the patient and the time of the surgeon, and this latter argument is not without importance when we consider how long and minute is the task of dressing a resection of the knee.

M. Ollier thus formulates his conclusions.

1. Infrequent dressings are perfectly applicable to resection of the knee. 2. By employing iodoform, one can postpone the first change of dressings as long as forty, fifty or even more days. 3. Firm union of the knee can thus be obtained under one dressing. 4. This mode of proceeding introduces great simplicity into the after-treatment of resection of the knee.

C. B. KEETLEY.

## INDEX OF SURGICAL PROGRESS.

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### CHEST AND ABDOMEN.

**I. Traumatic Injuries of the Parenchymatous Abdominal Organs.** By Dr. L. EDLER (Metz). In a series of articles representing much laborious research, the author has presented a mass of material and cases bearing on his subject. In closing he gives the following lengthy summary:

#### A.—IN GENERAL.

1. It is difficult to form an estimate of the frequency of said injuries, as a large part, whose unfavorable course is considered self-evident, do not get published.

2. To this question war-surgery answers that out of about 1000 shot wounds there occurs one of the abdominal organs mentioned.

3. The frequency of the injury of each viscus is proportional to the size of the organ, the kidneys being reckoned double.

4. Etiologically, the traumatic injuries are divided into three groups, contusions and ruptures from blunt force, direct or indirect, shot wounds, and stabs, blows and cuts from sharp weapons.

5. The general symptoms of this group are the same as those from injury to any of the abdominal organs. The most prominent are shock, internal hemorrhage and general peritonitis.

6. Shock is proportional to the intensity of the trauma and therefore most pronounced in subcutaneous, next in shot wounds.

7. The greatest danger from these gland injuries lies in hemorrhage into the free abdominal cavity, either from the afferent or efferent vessels, or from the turgescient gland substance itself. The bleeding may be primary, or secondary after transient blocking of the vessel.

8. General traumatic peritonitis is in all cases a result of septic infection whose origin is specially favored by the characteristics of the peritoneum itself and of the contents of special viscera.

9. The undecomposed secretions of the glands may exert a local inflammatory action on the peritoneum, but in themselves do not produce septic peritonitis. Liental blood and pancreatic fluid are borne by the peritoneum without irritation; gall and urine produce violent local inflammation.

10. Local inflammation of the peritoneum covering abdominal glands leads to adhesions of the organs themselves or with the abdominal walls. Completely separated parts of organs may be firmly sealed up by the later organization of such exudations. Thus, also, heterogeneous effusions (pus, urine, gall, feces) become encapsulated.

11. The specific gland cells do not participate in the healing process within the injured gland. This occurs rather from cicatricial organization of the primary thrombus by transuded white blood cells through participation of the cellular connective tissue elements.

12. The portion of the gland destroyed by the trauma is not reproduced, but a defect results.

13. If, in the further of a gland injury, traumatic inflammation of the organ—rare on the whole—sets in, it may either subside or go on to suppuration (formation of an abscess).

14. In subcutaneous gland injuries traces of the external injury are rarely visible on the skin.

15. Open gland wounds have of themselves but little tendency to suppuration; the latter is usually caused by the presence of foreign bodies (projectiles, rags, splinters of bone) in the wound canal.

16. Since the gland tissue does not participate productively but regressively, gland wounds with great loss of substance are extremely slow in healing.

17. The prognosis of gland injuries is, though not so unfavorable as formerly believed, still dubious; this lies less in the gland injury than in complications.

18. The average mortality for all the groups amounts to 63.9%. (Subcutaneous, 77%; shot wounds, 57%; stabs and cuts, 45.6%).

19. In a general way the most frequent causes of death were: extent of injury, hemorrhage and general peritonitis.

20. As regards the last two the antiseptic method offers a definite prospect of reducing the mortality in future.

21. The treatment of gland injuries in general is two-fold: (a). Mechanical-medicamentous, and (b), operative.

22. The former, directed against shock, internal hemorrhage and for preventing and combating peritonitis, is in all the groups of injuries to be carried out according to recognized principles.

23. For the general management of open glandular wounds the following points may be specially mentioned:

(a). Of retained projectiles only such cases as can be easily, quickly and harmlessly found with the fingers, well disinfected, are to be extracted.

(b). Great weight is to be laid on primary hemostasis even after dilatation of the wound to reach the source of hemorrhage. otherwise by antiseptic tamponing.

(c). All peritoneal traumatic and operative wounds are to be subjected to the strict antiseptic method.

Therefore:

(a'). Carbolic spray is to be retained (in operative wounds) despite danger from cold and intoxication.

(b'). Because of the special characteristics of gland wounds (continuing secretion) primary drainage is to be applied. Clamped caoutchouc drains are best, contra-openings being made if necessary.

(c'). Primary disinfection of the wound tract is demanded where there is no danger of renewed hemorrhage. Secondary antisepsis by irrigation should also be attempted, leaving organizing thrombi so far as possible undisturbed.

(d'). Covering dressings should consist of antiseptic material in abundance to avoid early soaking through where the glandular secretion is free.

24. Operative treatment may demand laparotomy:

(a). For local hemostasis, *i. e.*, for ligation of larger intra-abdominal vessels or closure of bleeding organs.

(b). For removal of endangering peritoneal exudations.

(c). For opening intraperitoneal collections of pus or abscesses in the gland itself.

(d). For extirpation of glandular organs.

## B.—IN PARTICULAR.

## I. INJURIES OF LIVER AND GALL-BLADDER.

25. The size, weight and attachments of the liver cause the frequent occurrence of subcutaneous lesions from indirect force—falling on the head or feet.

26. The following are the special symptoms of liver injuries.

(a). Pain, local and irradiated. Pain in the right shoulder, although not constant, is still a very important sign.

(b). Icterus. This occurs in about one-fifth of the cases. Excluding hematogenic traumatic icterus, the kinds can be distinguished.

(a). Primary icterus arises from resorption of gall effused into the peritoneal cavity.

(b). Secondary icterus arises in the course of hepatitis (abscess-formation), from compression of the gall passages and resorption through the hepatic bloodvessels.

(c). Glycosuria is not to be considered a sign of liver injury.

(d). In open liver wounds the discharge of gall from the same is a sure and relatively frequent (41.3%) symptom. It may be primary or secondary after separation of the crust.

27. Experimental observations on animals showed injury of the liver-tissue itself to be a slight lesion cicatrizing usually in 5 to 10 days. Suppuration rarely developed.

28. As to the clinical course:

(a). Lighter injuries may heal without any symptoms.

(b). Inflammation of the liver is seldom observed.

(c). Traumatic abscess of the liver occurred in 11.3% of all injuries. Its seat was commonly on the convex side. Fever, shoulder pains, sallow skin are pregnant signs. Icterus 16%.

(d). Liver abscesses may either undergo caseation or lead to perforation. The latter, after formation of adhesions, may be into other organs, external, or into the free peritoneal cavity.

(e). General peritonitis resulted in 19.7%. This rarely ended in recovery.

29. The separate groups of injuries terminated as follows:

(a). The subcutaneous. Of all cases 85.8% died; of the uncom-



plicated 78.2% died. The average duration of cure was three weeks. The most frequent causes of death were: Size of the injury 12.3%, hemorrhage 42 $\frac{1}{2}$ %, inflammatory affections 20.9%. The right lobe was most frequently the seat of injury, and the convex side twice as often as the concave.

(b). Shot wounds. Of all cases 55% died; of uncomplicated but 39.1% died. Average duration of cure two to three months, usually from the presence of foreign bodies, notably, splinters from the ribs. Causes of death: Size of injury 27%, hemorrhage 20%, suppurative and inflammatory processes 37 $\frac{5}{8}$ %. As in gunshot wounds of bone liver sequestra are observed from extensive fissuring of the gland tissues.

(c). Cut and stab wounds. Of all cases 64.6% died; of the uncomplicated 37 $\frac{1}{2}$ % died. Cures resulted on an average within one to two months. Death resulted from the size of the injury in 17 $\frac{1}{2}$ %, from hemorrhage in 15%, from inflammatory processes in 47 $\frac{1}{2}$ %. In this group the left lobe was more frequently involved than the right.

30. Of injuries to the gall-bladder and passages there are cures in each group. Shot wounds show the most favorable course. Of all cases 74.2% died, nearly all from general peritonitis.

31. The mortality from all liver injuries amounts to 66 $\frac{8}{10}$ %, from the uncomplicated 54.6%.

32. Prognosis:

(a). The greatest danger lies in complications.

(b). Injuries of the convex side have a much better prognosis than those of the concave.

(c). Injury of the liver tissue alone is far less dangerous than was formerly supposed.

(d). Injuries of the gall-bladder are not absolutely fatal.

33. In treatment of liver injuries where hepatitis is anticipated, extraction of blood about the anus relieves greatly.

34. Treatment of liver abscess aims at the earliest possible evacuation of the pus, either by puncture or incision, in any case avoiding its entrance into the peritoneum.

35. Puncture is either exploratory or radical. This is indicated in deep abscesses, but should be done successively to avoid hemorrhage from the abscess walls (ex vacuo).

36. Antiseptic incision may be undertaken at one or two sittings, the former after fixation of the liver to the abdominal wall by suture. Both methods show brilliant cures, still from greater safety the one in two sittings is preferable.

37. Liver-prolapse may be removed if necessary by ligature or *écraseur*.

38. Peritoneal effusions of gall, after encapsulation has occurred, are to be treated by puncture as early as possible.

39. Wounds of the gall-bladder may, after any necessary dilatation of the wound, be smoothed and closed by suture. The physiologically dispensable bladder may be removed if necessary.

## II.—INJURIES OF THE SPLEEN.

40. The morbidly altered spleen is with relative frequency the object of subcutaneous injury (28%). It may even be caused by powerful muscle contractions (diaphragm).

41. The symptoms of rupture of the spleen are almost completely masked by those of a hæmorrhage into the peritoneal cavity. Characteristic signs are not present.

42. The diagnosis gains in probability if after trauma of the renal region there is sudden local pain as also pain irradiated towards the left shoulder. The latter sign is not so characteristic as the right-sided shoulder pain in liver injuries.

43. Open spleen wounds may be diagnosticated from the seat and direction of the wound, the quantitative and qualitative characters of the external hæmorrhage, and in some cases by digital exploration. In stab and cut wounds total or partial prolapse of the spleen is a frequent occurrence.

44. The course of experimental lesions of the spleen with relatively small hæmorrhage was notably favorable.

45. The frequency, signs and termination of traumatic splenitis are analogous to those of the liver.

46. Traumatic abscesses of the spleen, despite considerable extent, may long remain latent. It was found in 30 per cent. with 50 per cent. recoveries. Its tendency to perforation corresponds to that in liver-abscess.

47. General peritonitis from splenic injuries is very rare, and then nearly always the result of an abscess-perforation.

48. Splenic injuries terminate as follows:

(a) Subcutaneous. Of all cases 86.7% died, of the uncomplicated, 82.3% died. Rupture of the diseased spleen is more favorable than of the healthy. Average duration of cure fourteen days. Cause of death was hæmorrhage in 86.6%. Autopsies showed the tear to be more frequently on the concave than the convex side.

(b) Shot wounds. Of all cases 83.3% died; of the uncomplicated 65%. Splenitis was only observed after coincident contusion. Suppuration was rare and usually from the presence of foreign matter. Hæmorrhage is almost the sole cause of death in uncomplicated cases.

(c) Cut and stab wounds. All non-operative cases gave 17.1% deaths; operative no deaths; uncomplicated 33.3%. Duration of cure is prolonged by recurring secondary hæmorrhages.

49. The mortality from all splenic injuries is 70%.

50. Hæmorrhage is about always the cause of death from rupture and in about half the cases from shot wounds.

51. Removal of the spleen is indicated:

(a) In subcutaneous injuries where the hæmorrhage would otherwise be fatal or where the organ is extensively destroyed.

(b) In open wounds where large vessels are injured and tamponing proves useless.

(c) In deep pathological alterations of the prolapsed and in suppuration of the non-prolapsed spleen.

52. Prolapse with or without injury to the organ and abscess are to be treated according to the already described methods.

### III.—INJURIES OF THE PANCREAS.

53. Traumatic injuries of this organ are exceedingly rare and nearly always combined with those of other organs.

54. In the etiology of its subcutaneous injury, being run over across the upper abdominal region stands first.

55. There are no characteristic symptoms of its subcutaneous injury partly because pancreatic fluid does not irritate the peritoneum.

56. Traumatic inflammation of the organ is not observed in any class

of injuries. Retention-tumors may, however, be caused by injury or compression of the excretory duct (concretions).

57. Experiments on animals prove that lesion of the gland-tissue alone may heal readily.

58. Low position of the stomach and certain positions of the body allow the pancreas to approach the anterior belly-wall and in wounds of these parts give occasion to prolapse of the gland.

59. Discharge of pancreatic fluid from the wound has not been observed after shot injuries, though once after a stab.

60. Scattered cases of cure have been described for all groups of injuries. Cut-stab wounds, after removal of the prolapse heal readily in a few weeks.

61. Prognosis in pancreatic injuries simply is not less favorable than in those of the glands.

#### IV.—KIDNEY INJURIES.

61. The injuries of these organs fall into two chief groups quite separate in deportment, the extraperitoneal (complicated, uncomplicated) and the intraperitoneal.

63. Subcutaneous injuries arise more frequently from direct than from indirect force. Muscular contractions may also lead to organic lesion.

64. Cut-stab wounds of the kidney are rarely observed.

65. Of all the abdominal organs the kidneys give the most striking symptoms of injury. They may be divided into primary and secondary.

To the former belong :

(a) Phenomena of shock (severe vomiting). This occurred more frequently and intensely than with the other organs.

(b) In extraperitoneal rupture perineal blood-extravasations form. Here the danger of bleeding to death is far less than when into the free abdominal cavity.

(c) Symptoms of general peritonitis are exceptional in extraperitoneal lesions, nearly constant in intraperitoneal.

(d) Local nephritic pain is constant and irradiated especially to the

testicle (retraction); it accompanies in particular kidney colic from the blocking of the ureter by clots.

(*e*) Hæmaturia is a very frequent symptom (70%). and often relapsing. (ther disturbances of exuresis (anuria, oliguria, dysuria) are closely connected with temporary blocking of the urine conductors by hæmorrhage.

To the secondary symptoms belong:

(*a*) Traumatic nephritis with albuminuria (casts), pyuria, abscess of the kidney and sympathetic nephritis of the non-injured kidney.

(*b*) Paraplegic symptoms, not to be regarded as reflex but as dependent, usually on parallel concussion of the cord or larger nerve trunks.

(*c*) In open kidney wounds the discharge of urine through the external wound (24.2%).

66. As to the healing of kidney injuries experimental observations give results analogous to those from the other glands.

67. The clinical course is as follows:

#### IN SUBCUTANEOUS INJURIES.

(*a*) Uncomplicated injury of the kidney is far more frequent than of the other glands (53%).

(*b*) Traumatic nephritis is rare. When it does occur it leads to suppuration more readily than to recovery. Nephritic abscess usually has its seat in the cortical substance, and may give occasion to calculous formation or to obstinate kidney-fistula.

(*c*) Perineal extravasation of blood with or without admixture of urine leads to perinephritic abscess especially where there is occasion for decomposition. It may perforate spontaneously.

(*d*) Hydronephrosis has been observed a few times after lesion of an ureter.

(*e*) Of all cases one-half (50%) recovered; of the uncomplicated 24.2%; of the complicated 24.2%.

(*f*) The cure lasted on an average three to four weeks.

(*g*) Causes of death; size of injury and primary hæmorrhage 60%, peritonitis 11%, suppurative processes 7%, complications 15%.

(*h*) Rupture was usually transverse and crossed the whole organ.

## IN SHOT WOUNDS.

(a) Uncomplicated shot-wounds of the kidney have a more favorable course than the analogous gland-injuries.

(b) Primary hæmorrhage, traumatic nephritis, intra- and extra-renal abscesses have rarely been described. Suppuration is usually limited to the immediate vicinity of the shot canal.

(c) Collective cures 56%; uncomplicated 85%; complicated 16.6%.

(d) Duration of cure, from the admixture of urine was very protracted—several months to three-quarters year.

(e) Death most frequently resulted from pyæmia, and cachexia from suppuration, peritonitis, and only in a few cases from hæmorrhage.

(f) Here also encapsulation of foreign bodies has been observed.

## IN CUT AND STAB WOUNDS.

(a) Collective cures 58.3%; uncomplicated 85.8%; complicated 0.0.

(b) Average length of cure was one month. Prolapse of the kidney healed uninterruptedly after removal.

68. The mortality from all kidney injuries was 47.3%—16½% lower than the average mortality from all the glands. Mortality from extraperitoneal 30.4%, from intraperitoneal 80%.

69. Prognosis.

(a) About one in three of the subcutaneous extraperitoneal injuries and one in four of the shot wounds terminated fatally; cut-stab wounds are more favorable still.

(b) In intraperitoneal injuries the prognosis is very bad, that of the open even less favorable than that of the subcutaneous, and worse than that of the abdominal glands, though still not absolutely fatal.

(c) In subcutaneous injuries primary hæmorrhage is the most frequent cause of death; in open wounds peritonic and suppurative processes.

70. The mechanical-medicinal treatment is symptomatic.

71. For operative procedures nephrotomy or nephrectomy may be necessary.

72. The indications for the former are local stasis of primary or secondary hæmorrhage, or the earliest possible relief of dangerous suppuration.

73. Indications for nephrectomy are:



- (a) In subcutaneous injuries where the patient is bleeding to death.
- (b) Always in severe suppuration where nephrotomy does not suffice.
- (c) A prolapsed kidney that is irreducible or pathologically changed.

74. Contraindications :

- (a) Congenital defect of the other kidney or anomalies like horse-shoe kidney.
- (b) Cohesion or sympathetic disease of the other kidney.—*Arch. f. klin. Chirg.*, 1887, Bd. 34, hft. iv.

## GENERAL SURGERY.

**I. Surgical Diseases which Man has Acquired by Changing to the Upright Position.** By Dr. ALBRECHT (Hamburg). The tendency to pass to the two-legged attitude is present in nearly all mammalia. In man it is most thoroughly carried out. The altered body carriage may be the cause of various morbid processes.

(1). Bone diseases, resp. troubles resulting therefrom ; pathological skolioses—emphasized normal forms—spondylitis, cold sinking abscesses, coxitis, genua vara and valga, spondylolisthesis.

(2). Migration of poorly attached retroperitoneal organs, viz., kidneys, ovaries and especially testicles.

(3). Hernia, of hypogastric region in the widest sense.

(4). Varices, varicoceles, hæmorrhoids.

(5). The so-called pulsion-diverticula of the œsophagus. The retropharyngeal pockets he finds lie in the position of the cœcum œsophageum of various mammalia. In quadripeds food-particles can be more easily regurgitated therefrom. His theoretical considerations cannot be conveniently reproduced.—*Rept. of XVI Germ. Surg. Congress in Cent. f. Chirg.*, 1887, No. 25.

**II. On Artificial Respiration and Artificial Heart-Motion.** By Prof. KRASKE (Freiburg). In a child, æt. 5 years, strangulated 12 to 15 min. by croup, tracheotomy was performed and artificial respiration (Sylvester) begun. In a few minutes the lips became red, the cheeks soon also, and the pupils narrowed. On stopping respiration all this subsided but reappeared on renewal of efforts. Life did not

return, hence the phenomena must have been produced by an artificial circulation. In animal and human cadavers he was able, after the heart was quite dead, to start a circulation from the veins through the right side of the heart into the aorta system. Even in cadavers three days old he succeeded in producing a reddening of the lips and a pupillary narrowing.

Evidently the various forms of artificial breathing must act very unequally in moving the blood. Direct insufflation of air cannot have much effect, as it simply increases the intra-thoracic pressure. The method of rhythmic compression of the thorax alone can likewise produce but slight aspiration—this through the elastic rebound of the ribs. Sylvester's method best fulfills all requirements. To further increase the effect of the respiratory movements on the circulation he recommends inspiration and expiration with closed air-passages (Müller's and Valsalva's experiments). But with a still heart artificial respiration does not suffice. The heart must also be compressed. With children the elasticity of the thorax walls admits of this being done directly. Not so in adults. In them at the expiration the abdomen must also be compressed. The inverted position acts similarly and besides favors the blood flowing in from the lower cava.

His method of resuscitation is, to immediately bring the person into a nearly inverted position and perform artificial respiration according to Sylvester. The single respiratory movements must be carried out most forcibly. At each expiratory compression of the thorax an assistant must compress the abdomen with both hands spread out. A second assistant has from time to time, say at every fifth respiration before the beginning of the expiratory movement and during its continuance, to hold the mouth and nose tightly closed. At somewhat longer intervals, say every tenth respiration, it would also be well to do the same during the inspiration.

In the discussion Heusner reported a case of brain-tumor in which, after life had ceased, artificial respiration caused reddening of the lips and a return of the pulse, but no pupillary or muscular reaction. After four hours artificial respiration the pulse ceased. In another case, of chloroform collapse in a girl æt. 20 years, after over three hours, ar-

tificial respiration breathing finally returned—in bath—and the patient lived three hours. In thin patients he used Schüller's method of drawing up the border of the ribs.

Langenbuch related a case of chloroform death in an ataxic in which, after a half hour's unsuccessful artificial respiration, he rapidly opened into the pericardium and rhythmically compressed the heart with the hand. The face was observed to blush.—Rept. XVI, Germ. Surg. Congress in *Centbl. f. Chirg*, 1887, No. 25.

**III. Erysipeloid and Its Etiology.** By Dr. ROSENBACH (Göttingen). This so called "chronic erysipelas" or "wandering erythema" is long recognized but slight and harmless affection. It is a local trouble quite typical in its course and is caused by a special microbe. Though a traumatic infectious disease it is probably never transmitted directly but occurs sporadically from inoculation of wound-spots with ectogenic existing material. This occurs in all kinds of refuse of animal matter, hence certain persons are particularly exposed as game-dealers, cooks, restaurateurs, butchers, tanners, fish-mongers, oyster-openers, dealers in cheese, herring, etc. Naturally the hands are the most frequent starting point of the affection as they are chiefly exposed.

The general condition and body-temperature are not influenced. The infiltration of the skin has a sharp border but progresses very slowly—taking, *e. g.*, a week from finger tip to metacarpus. Duration of the affection is indefinite, one to three weeks. He corrects his former statement that the cause was a pure coccus. In November, 1886, he secured new cultures and successfully inoculated himself on the arm. Circumscribed redness appeared on the third day. By the eighteenth day, at the periphery, it had only a diameter of 24x18 cm., whilst in the centre it was again normal. In gelatine cultures he first found coccus-like bodies larger than staphylococcus, later also interwoven threads showing false dichotomy. Without attempting to classify the microbe he states its resemblance to Cohn's *cladotrix dichotoma*.—Rept. of XVI Germ. Surg. Congress in *Cent. f. Chirg*, 1887, No. 25.

**IV. On the Action of Iodoform as an Antiseptic.** By Dr. DE RUYTER (Berlin). This is a refutation of the practical conclusions by the Danes Heyn and Rovsing. He agrees with them that iodoform-powder, outside the animal body, where it remains undecomposed is not antiparasitic. However it protects artificial nutritive media and wounds, like a filter from falling micro-organisms.

It must further be acknowledged that germs may be carried by iodoform powder, yet this occurs just as readily with other dry antiseptic material. In artificial cultures where the conditions correspond to those in practice, iodoform exerts a positive antiseptic action. Mixed with pus and kept at the body-temperature it decomposes, yielding a readily demonstrable iodine compound; this is with ptomaines which thus lose their dangerous properties. Sterilized blood or blood serum does not decompose iodoform, but as soon as pus cocci are added the decomposition begins. The cocci, though not killed, are influenced unfavorably. Correspondingly strong solutions of pure iodine are not so efficacious as when the iodine is freed by decomposition. For rapid disinfection of wounds or dressing material an iodoform-ether-alcohol-solution is suitable.

Senger (Magdeburg) added that iodoform greatly impedes and modifies the growth of anthrax bacilli, and destroys their inoculability on fresh gelatine. If iodoform is introduced into an animal and then immediately anthrax germs these act fatally; but if the iodoform has had time to decompose first, the germs are not fatal. It follows that a wound-surface must first be aseptic to have iodoform act.—Rept. XVI Germ. Surg. Congress in *Centbl. f. Chirg*, 1887, No. 25.

**V. On the Antitubercular Action of Iodoform.** By Prof. P. BRUNS (Tübingen). The opinions regarding the local action of iodoform on tuberculosis still differ widely because by the ordinary way of using the remedy it is hardly possible to collect positively decisive observations.

B. communicates the results of clinical observation and histological examination. They speak decidedly for the specific antitubercular action of iodoform. His data were derived from the treatment of cold tubercular abscesses by puncture and injection of iodoform—10% mixture

of iodoform in equal parts of glycerine and alcohol. Here and there the abscess would gradually diminish after even one injection, commonly after two or three, and presently disappear entirely. Of 54 abscesses treated in this way, 40 were cured including numerous voluminous ones with  $1\frac{1}{2}$  to 1 lb. pus, especially a number of large sinking abscesses of pelvis and thigh from spondylitis. As the major part of the cured abscesses were certainly tubercular the constant results of the treatment with iodoform can only be explained by its continuous contact with the cavity-lining causing degeneration of the tubercles and the tubercular layer of the abscess-wall. This action was directly proven on a number of patients by excision of the wall some time after the injections. Exact histological examination by Prof. Nauwerck showed that the bacilli had always disappeared and tubercles ceased to proliferate. The tubercular layer of the abscess-wall yields to necrosis and fatty disintegration, and is displaced by normal vascular granulations, until they mix with the fluid contents. Hence the antitubercular action of iodoform is specific, antibacillary.—Rept. of XVI Germ. Surg. Congress in *Centbl. f. Chirg.*, 1887, No. 25.

(1). VI. On the Germs Contained in Soaps and Dressing Materials. By Dr. A. VON EISELBERG (Billroth's clinic). (2). On Sterile Dressing Materials. By Dr. SCHLANGE (Berlin). The first investigation covered a variety of soaps (surface as well as center of the samples examined), almond paste, white (hydrophile) gauze both fresh and such as had been cut up and distributed for use, sterilized gauze-compresses, iodoform and carbolic gauze, iodoform wicking, absorbent cotton, the center of dressings already used, calico, wood wool, plughawar Djambi (a styptic) and tents of sponge, tupelo, and laminaria.

The almond, glycerine, potash and sublimate soaps are in general free from bacteria so that their immediate use for washing the surgeon's hands and the operative field is admissible.

Other cheaper soaps are not so free from germs, but may be used, preferably after longer heating to  $100^{\circ}$  or soaking for  $1\frac{1}{4}$  to  $1\frac{1}{2}$  hour in  $1\frac{1}{10}\%$  sublimate.

Almond paste is so rich in germs that it ought to be sterilized by drying in cotton-plugged glass receptacles. White gauze should be boiled just before impregnation with iodoform mixture. This latter procedure and the subsequent drying ought not to be carried on in sick rooms, but in pure, dust free air. For the various dressing materials he advises sterilization by drying at  $100^{\circ}$  C. and preservation in air-tight glass receptacles. It is advisable to treat the different tents, especially those of sponge, in like manner. Laminaria sometimes splits longitudinally on heating the requisite 10 min.—*Wien. Med. Woch.*, 1887, Nos. 19, 20, 21.

The conclusions arrived at by Schlange are, so far as they go, in harmony with the preceding. He found that none of the dressing materials in the market were with certainty free from germs. Evidently, their sterility had been lost by the drying and packing after their impregnation with antiseptics. Of course, most of these casual germs are not pathogenic, but there is no guarantee.

Dry sublimated gauze is not practically a parasiticide. However, its favorable action explains the experience of certain surgeons that an aseptic wound is safe under simply an aseptic dressing.

The correct preparation of dressing material then consists in destroying all organisms in it. In the Berlin clinic this is now accomplished by subjecting the material to a current of steam of  $100^{\circ}$  C.

In the discussion Höffler stated with regard to antiseptic material now being stored for the German army that the centres of the packages were quite sterile, and that from the outside layers only occasional germs could be developed.—Rept. of XVI Germ. Surg. Congress in *Centbl. f. Chirg.*, 1887, No. 25.

**VII. Practical Value of Secondary Wound-Suture.** By Prof. HELFERICH (Greifswald). This modification, introduced by Kocher and Neuber [*v. ANNALS*, 1885, Jan., p. 89, and 1886, May, p. 436] and very recently described by Bramann from Bergmann's clinic, is regarded by H. as the most important of any since wounds were first sutured. Its original purpose was to do away with drainage.

The cases where this method is valuable he divides into four groups.

1. Where it is proposed to operate for septic local affections in inflamed or suspicious tissue. If deformative operations are here under-



taken at the boundary of the septic region, it is often a question whether to try for direct union or not. He would wait instead and suture secondarily if everything went favorably. Examples are given of amputation of arm and leg in more or less involved tissues (sewed up in 2 resp. 4 days) and exarticulation of foot for putrid gangrene of toes (sutured once in 4, and once in 6 days). In these cases he still has recourse to drainage after suturing. This method is indicated where fever does not appear at all after amputation or where it disappears in a few days and the wound looks well. But the after-suturing is not generally advisable where despite the good general condition of the wound fever continues from metastatic septic processes. In some cases the flap must be taken large to allow for the shrinkage before closure. He has also thus treated abscesses, phlegmons, bursal inflammations, etc.

Where the operation can be done in normal tissues a dry absorbent antiseptic dressing is best for the interim, otherwise moist disinfecting dressings are better.

2. Operations for tubercular processes, usually in bone and joint troubles. In this he agrees with Bramann. Of course, the wound is tamponaded in the interim with iodoform gauze to which he ascribes even specific curative properties. He believes further that the slight degree of cicatrization occurring in the 2 to 6 days, also plays a part in eradicating the morbid agent. In case of resection of the knee it is not well to wait too long before secondary suture, since after about 6 days soft growths from the bone surfaces impede exact coaptation.

Gauze plugged directly into bony cavities may cause much trouble by becoming attached. To avoid this he first covers with silk.

3. A variety of healthy accidental and operative wounds where this method is advantageous, as, *e. g.*, where hemorrhage is otherwise difficult to control, where there is a large cavity (kidney extirpation, trepanation for fracture of the skull, removal of large echinococci), etc.

He also recommends it in larger amputations for time of war and for the inexperienced.

4. For operations on or about the anus and urinary passages, and even about the mouth or nose.

In many cases narcosis is necessary for the secondary operation.—  
Reprint from *Münchn. Med. Woch.*, 1887, No. 21.

W. BROWNING (Brooklyn).

# A NEW SURGICAL OPERATION FOR THE TREATMENT OF CANCER OF THE STOMACH.

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SINCE Waldeyer found that in all cases of primary carcinoma of the stomach, the malignant growth derives its origin from the epithelial elements of the mucous membrane, the pathological anatomy of the disease has been greatly simplified. The pathogenesis and ætiology have also been brought to a high degree of perfection by the comprehensive work of Brunton and of von Winiwarter. All the advances made in the treatment of this disease during the past five years are based upon the above-mentioned works. The progress that has been made lies purely within the domain of surgery. The internal therapeutics have scarcely progressed, either in the way of relieving the sufferings of the patients, or of lengthening their lives, and least of all in the direction of a radical cure. We may justly claim, however, that surgery has made advances in each of the three directions indicated, with a small but certain degree of success. The operations which have been performed are mainly three: (1) pylorotomy, (2) gastroenterostomy, (3) Loreta's operation (dilatation of the pylorus after gastrotomy). All of these have been fully reviewed in the ANNALS OF SURGERY and need no further description here.

My own experience with these operations has been limited. I have performed seven laparotomies in cases of cancer of the stomach, the intention being to do one of the three operations; and, only in one case were the conditions revealed by the exploratory incision such that I felt justified in proceeding farther. This was a case of pylorotomy which ended fatally nineteen hours after the operation. The other six cases were in no way influenced by the laparotomy either for better or for worse.

Early in the present year I began a careful study of the pathological anatomy of cancer of the stomach, being principally guided by the two works above cited; also by a study of all the literature which has accumulated as a result of the surgery practiced on this disease; and by holding autopsies on all the cases that I could obtain. A list of these works is appended.

I soon found that any operation, aiming at a radical extirpation of the disease in all cases, was intrinsically absurd. Not because the disease is essentially incurable, but because in the majority of cases that seek assistance at our hands, the disease has ceased to be a local one, and a radical extirpation is entirely out of the question. This fact has, of course, been well understood for a long time, and has had a paralyzing effect upon the efforts of surgeons. The most plausible operation which has been suggested in these cases is Wölfler's gastro-enterostomy. This operation has found but little favor, because few are willing to undertake a surgical feat of this magnitude, in a case which they know to be doomed at all events. The operation is in itself a masterpiece, requiring great skill on the part of the operator.

The history of surgery has proven that all operations which subject a patient, already doomed to certain death, to great additional danger of suddenly losing life, and which offer no chance for a radical cure, have found little favor among the profession, and will not be recommended. This is the reason why gastro-enterostomy has been done only a few times. To give a definite mortality rate is impossible, because the majority of fatal cases have never been published.<sup>1</sup> Loreta's operation has only been done eight times, and with so little success and such poor satisfaction that in cases of cancer it should be totally abandoned. This operation may be of value in certain non-malignant strictures of the pylorus, and will probably be retained for this class of cases.

The above observations and facts give a correct view of the

<sup>1</sup>I am told by a surgeon who recently visited European universities that nearly every operator has tried it once or twice, but I can find no records of cases. The mortality of published cases is given as  $62\frac{1}{2}\%$  in a recent publication.

question as I found it. Let us now take up my own investigations and results. It is known that one-half of all cancers of the stomach start near the pylorus, and that in nine-tenths of all cases they have a tendency to grow towards the lumen of the stomach. In the beginning the mucous membrane is the seat of the disease, the sub-mucous, loose connective tissue is next attacked, and only in the last stages are the muscular and serous coats invaded by the neoplasm. These facts hold good especially in cases of scirrhus and medullary cancer. The alveolar or colloid cancer, which is the rarest form, seems to attack the submucous tissue and the serous or subserous tissue almost simultaneously.

Köster says that in this variety of cancer, the muscular layer separates two groups of flat tumors, the one projecting on the mucous membrane, the other on the peritoneal surface. It is conceded by all observers that the muscular layer offers the most resistance to the spread of all varieties of cancerous growths. In fact, it becomes much hypertrophied in the majority of cases, and only yields to the invasion of the carcinoma by an ingrowth of the malignant tissues between the fibres.

Primary sarcoma of the stomach, which is known to originate in the connective tissue is very rarely found, and cannot be diagnosticated except by microscopical examination.

The important point which I wish to call attention to is, that *cancer of the stomach originally grows inside the muscular layer towards the lumen of the organ.* The earliest symptoms of the disease can be accounted for by remembering this fact. A growth which partially fills up or projects into the stomach, will cause symptoms of stricture exactly in proportion to its proximity to the pylorus. It will also tend to ulceration and sloughing and consequent hæmorrhage, according to the amount of obstruction which it produces. Symptoms of this kind will precede those of cachexia in the majority of cases. We cannot here enter upon a discussion of the treacherous and chameleonic symptoms of cancer of the stomach, which complicate such cases. The discussion of these has lost most of its interest for us since we can perform laparotomy for diagnostic purposes.

In order to clearly formulate the second premise which led

me to the proposal and execution of my operation to be described below, I would for a moment call attention to our treatment of cancer of the uterus by curetting. All surgeons have met with large numbers of cases of cancer of the uterus which come into their hands in an advanced state. The vagina is more or less filled up with a cancerous mass, sometimes sloughing or discharging a septic, ichorous liquid. In some cases the patients have been much reduced, show signs of cachexia either complicated by profuse and frequent hæmorrhages at long intervals, or perhaps by slight continuous bleeding. In a number of cases of cancer of the stomach, a precisely similar picture is presented when that organ is laid open at the autopsy. I have in the past year seen six cases that would answer this description. The resemblance in some cases was most striking, and I am free to confess that the operation which is the subject of this paper was first suggested to my mind by these observations. I need not dwell upon the great benefit, both in regard to alleviating suffering and lengthening life, which the careful and thorough *évidement* of cancer of the uterus by means of sharp and blunt curettes, constantly affords to our patients. It is the only rational treatment of cancer of the uterus where the total extirpation is no longer possible, and is so universally adopted by all surgeons and gynæcologists as the best expedient that it requires no additional arguments here to establish its usefulness.

In order to avoid repetition I will state what my operation is and give a detailed description in connection with a history of two successful cases. *The operation consists in performing gastrostomy, after which the cancerous growths are removed from within the stomach by means of curettes or other suitable instruments.*

CASE I.—Mr. H. C. æt. 48, farmer, clear history of tuberculosis in his family, had been puny and poorly developed up to the age of 21, then grew stronger and enjoyed good health up to one year ago. He began to complain of dyspeptic symptoms, for which he was treated by Dr. Ligget for nearly six months getting more or less relief. After this period pain after eating and pain on pressure over the epigastric region were constantly present. His pain was always greatly relieved



by eructation of gas. During the last three months he has vomited with great regularity nearly every day. The substance thrown up was the characteristic coffee-grounds; sometimes there was fresh-looking blood mixed with the vomit. The vomiting occurred, as a rule, about three hours after dinner. The appearance of the patient was plainly cachectic, he had lost more than twenty pounds during the year. The examination of the abdomen revealed a movable tumor apparently as large as the fist. From this history and examination there could scarcely be a doubt as to the diagnosis.

I proposed an explorative laparotomy, with the understanding that any further procedure should depend on what we might find. The patient readily agreed to leave the whole thing to my judgment, and would not listen to any detailed explanations of the surgical possibilities.



FIG. I.—CANCER OF STOMACH, Case I.

On June 5, after the usual preparations, I proceeded to do the operation. The incision was made, beginning one and one-half inches to the left of the linea alba and one inch below the ensiform process parallel to the border of the ribs and extending towards the left about three and one-half inches. After reaching the abdominal muscles I proceeded down to the peritoneum with as little cutting as possible. Only about one-half inch of the rectus was cut through and the fibres of the obliqui and their aponeuroses were more torn through than cut, my object being to leave as much intact muscular tissue around the artificial mouth as possible. The length of the incision through the peritoneum was not quite two inches. The anterior wall of the distended stomach presented itself in the incision. By introducing three fingers into the abdomen the tumor was easily felt and its size made



out (see Fig. 1). The examination proved also that the tumor was adherent to the pancreas and that numerous epiploic lymphatic glands were enlarged and indurated. Pylorectomy was impossible and I proceeded at once to perform gastrectomy. In order to determine what part of the stomach would most easily adapt itself to the incision with the least possible tension on the organ, I pushed a fine trocar into the stomach and allowed nearly all the gas to escape. After withdrawing the canula, a point indicated by the dotted line in Fig. 1, presented itself in the incision. The lips of the incision were now drawn wide apart, the parietal peritoneum was caught up by four fine sutures and drawn out, as is well shown in Fig. 2, to the point where the knot of

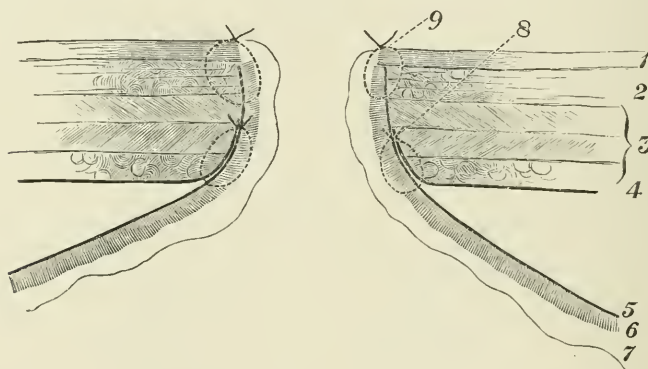


FIG. 2.—DIAGRAM SHOWING METHOD OF FASTENING STOMACH TO ABDOMINAL WALL.

1, skin; 2, subcutaneous fat; 3, muscles; 4, parietal peritoneum; 5, peritoneum of stomach; 6, muscularis; 7, mucosa; 8, buried catgut suture uniting the two peritoneal surfaces; 9, silk suture uniting skin, mucosa, etc.

the catgut suture is represented. The wall of the stomach was next grasped by a bullet forceps, the two prongs of which are so blunt that they will not perforate the tissues but will pinch it up securely and draw it out so that the apex of the tent will be somewhat above the level of the skin. While the stomach was held in this position fifteen catgut sutures were applied on each side attaching the stomach securely to the parietal peritoneum and the deeper layers of the muscles. (See Fig. 2). As many sutures as can reasonably be crowded into the available space, say one-eighth of an inch apart, should be used so as to insure perfect closure and even adaptation. Only the serous and muscular layers were included in the sutures. After this,

I irrigated the whole wound with a 5% solution of carbolic acid. This strong solution was chosen because I intended to thoroughly coagulate or, as it were, slightly cauterize all the exposed surfaces and tissues. After a few seconds all exposed tissues showed that well known whitish decoloration which follows the use of any strong antiseptic solution on living tissues. The object of this was to prevent any infection in case some of the contents of the stomach should come in contact with the wound. The smell of the escaping gas had proven that the contents must be very foul. Before opening the stomach, four or five deep sutures, uniting the angles of the abdominal incision, were inserted but not tied so that the remaining central opening could easily be made to correspond to the fistula of the stomach in size and thus facilitate the application of the silk sutures (Fig. 2). The stomach was opened by thrusting the sharp point of a scissors blade near the median end of exposed elliptical piece of the stomach and cutting this viscus open to the extent of about one inch and a half. The two lips were seized by tenacula and drawn up while a sponge was placed between them to prevent the escape of any contents. There was but very little oozing of blood from the cut mucous membrane and none at all from the other coats. By drawing up the lips of the stomach incision and by drawing down the lips of the skin incision a smooth artificial os was easily established by means of thirty-six silk sutures applied as is shown in Fig. 2.

The stomach was next carefully washed out with warm water, perhaps one gallon being allowed to flow in and out. The index finger was then introduced and felt a soft easily broken growth nearly filling up the pyloric end of the stomach but leaving the minor curvature intact. (See Fig. 1). The stomach was now well contracted and contained nothing but the tumor. I introduced my middle finger and with the two fingers began to tear away the masses of the growth and in this way removed over one-half of the entire mass. The stomach was full of blood, and blood was fast pouring out of the fistula along my fingers. I had often seen this fearful hæmorrhage follow the curetting of a uterine or rectal cancer and was not alarmed, knowing that it would promptly stop when the contractile and healthy tissue was reached. By means of the largest sizes of Simon's sharp spoons I scooped out all the soft masses until a grating noise was produced by the instruments against the indurated base of the tumor. As much of this was scraped away as seemed to be permissible. A current of cold carbolized water was next turned into the stomach and was allowed to run until the fluid returned clear. The stomach contracted to the size

of a small fist under this treatment, and I became convinced from what I saw that hæmorrhage from the stomach can be easily controlled by means of cold.

The operation lasted one hour and a half, the patient showed no signs of collapse and in fact slept quietly for five hours after the operation. Just before the administration of the chloroform he had been given  $\frac{1}{3}$  gr. of morphine hypodermically. The masses removed weighed 14 ounces and were *carcinoma vulgare* (Virchow).

Late in the evening, about nine hours after the operation, patient drank a glass of milk which he retained. He drank another glass at midnight, and another at 8 o'clock in the morning, complained of no pain and slept. When I arrived about 9 o'clock the next morning and

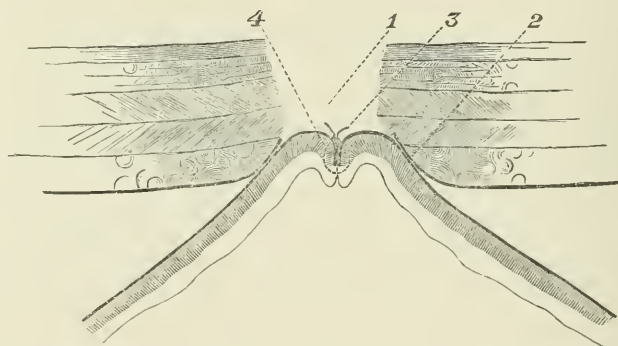


FIG. 3.—DIAGRAM OF METHOD OF CLOSING THE OPENING INTO THE STOMACH TEMPORARILY.

1, Space to be filled with gauze; 2, point of adhesion between stomach and abdominal wall; 3, the two layers of peritoneum held together by stitches; 4, loop of a stitch.

heard the above report, I fully expected to see the gauze and cotton which had been placed over the wound drenched with milk. But I was agreeably surprised when I found the dressings dry and adherent to the edges of the opening. I did not change them but replaced them and fastened the rubber elastic web which I use after every laparotomy fully satisfied to let well enough alone.

At 6 P. M. I returned, found temp.  $99\frac{1}{2}$ , pulse 80, patient comfortable. The nurse reported that he had one pint and a half of milk, two cups of beef tea and some water. The dressing was not changed until the fifth day when, probably on account of too voracious eating and drinking, a part of the contents of the stomach escaped through the

fistula. This greatly alarmed the patient, and I was sent for. I changed the dressings and they had to be changed twice or three times every day thereafter, because there was more or less escape of ingesta through the fistula. On the sixth day I removed all the silk sutures, perfect union having taken place; the temperature and pulse were normal. On the tenth day the patient sat up, and on the twelfth day left the room. He was discharged on the 21st day, after having learned to nourish himself in such a manner that his fistula leaked but little. His appetite was good, he had no pain, no vomiting, and expressed himself in the most grateful words.

Two months after the operation he returned and I made a careful exploration with my finger while the patient was chloroformed. I found no return sufficient to warrant another curetting. The finger detected a hard granulating surface as large as two silver dollars at the seat of the tumor. Since his fistula was troublesome I closed it in the manner shown in Fig. 3. A glance at the drawing will explain the method. The edges were cut loose from the skin with scissors, then they were turned down by detaching them from the abdominal parietes with blunt instruments. The peritoneal surface was changed from a glistening smooth membrane to a white fascia-like character, but nevertheless the surfaces healed up by adhesion after being turned down and united by five Lembert sutures. The only precaution I took was to put the patient on very small diet for four days. The upper part of the wound was kept plugged with absorbent gauze, and was rapidly filling up with granulations when the patient was discharged with his fistula closed.

On September 20, patient writes me that he has vomited for the first time since the operation and that he is not quite so well. At my request he came to the hospital and I reopened the fistula wide enough to introduce one finger. Finding a distinct return of the carcinoma I introduced the curette and scraped away all that was soft and yielding, the masses removed weighing perhaps two ounces in all. The operation was very simple and required but ten minutes to finish. The patient was not compelled to take to his bed at all on account of it, and the fistula contracted so in a few days that there was no escape of contents from it at all. Patient has again gone home much relieved and in good spirits. I will make no attempt to completely close the fistula, because it is very probable that several more operations will be necessary before the patient must succumb. I have kept several cases of carcinoma of the rectum and of the uterus in rather comfortable condition by repeated curetting, for from two to four years, and there

is no reason why the same treatment may not be equally as successful in cases of cancer of the stomach.

CASE II.—Mrs. W. S., sent to me by Dr. Reiss, of Washington, Mo., æt. 51 years, had all symptoms of a stenosis of the pylorus caused by carcinoma in such a marked degree that the diagnosis was clear. Her sufferings were indeed pitiable; she was actually starving to death. She was much emaciated, having lost over 45 pounds during the past eight months. She usually vomited between two and three hours after meals. The vomit was always mixed with blood in various degrees of decomposition or digestion. After she had vomited she was accustomed to take a small quantity of peptonized milk and I think she derived most of her sustenance from this and small quantities of wine which she could bear on her stomach at times. At other times even these articles of food would cause her stomach to become dilated and extremely painful. The paroxysm of pain would last until relieved by vomiting, which sometimes kept the patient in agony for four or even five hours. This patient was in the habit of taking 1 to 2 grains of morphine per day.

A movable tumor was situated exactly in the median line between umbilicus and sternum. When the stomach was dilated or after meals the tumor moved about two inches to the right of the linea alba and downwards. The tumor was not much larger than a hen's egg and very hard. The patient demanded relief by an operation and agreed to leave to me the choice of the measures to be adopted. I prepared everything for a pylorotomy and performed the operation of laparotomy at the patient's residence, in St. Louis, on July 20. after the usual preparations. The tumor was easily found immediately after opening the abdomen in the linea alba. A section of it is represented in Fig. 4. The omentum was full of small indurated glands and the duodenum seemed firmly held down to the pancreas by adhesions. The pylorus also was firmly attached to the head of the pancreas by a bunch of hardened lymphatic glands. The pyloric end of the stomach was very hard, the tumor evidently being a circular scirrhus. I immediately closed the incision in the linea alba and then made another, parallel to the free border of the ribs, and performed a gastrostomy just as described in case I, with the difference that in this second case, the patient being much thinner, fewer sutures were used and the operation much more quickly finished.

On introducing the finger in the direction of the pylorus I found it impossible at first to pass even the end of my finger into the stenosed part. An injection of warm water was made with the hope of dilating



the contraction. This proved useless. After some trouble I succeeded in passing a bougie à boule, No. 24 French, through the scirrhus mass. Then, by first using smaller uterine curettes and following them with larger ones, I succeeded in scraping a tunnel through the mass into the duodenum large enough to admit the index finger. There was no alarming hæmorrhage at any time during the curetting. The curette was used in this case for thirty-five minutes and every portion of the indurated mass was removed, so that one of the assistants who examined after I had finished could feel no hard tissue on the surface whatever.

The masses scraped out weighed only 14 drachms, some parts of course being lost. The microscopical examination showed it to be a scirrhus cylindroma, which is a variety of epithelioma sometimes



FIG. 4—CANCER OF STOMACH.—Case II.

found at the pylorus and at other parts of the intestinal tract. The entire operation, explorative laparotomy included, lasted one hour and twenty minutes.

The subsequent history of the case offers no interesting particulars. The healing process was afebrile, all symptoms of obstruction have disappeared, appetite has returned and the patient has gained twelve pounds in weight, although little more than two months have elapsed since the operation. The fistula has greatly contracted and gives the patient so little inconvenience that she refused to have any operation performed for the purpose of occluding it. Patient has never once vomited since the operation, eats a regular "farm-hands" meal, and has completely given up the use of morphine.



From my experience in the two cases I hardly feel warranted in drawing very definite conclusions in regard to the best technique to be employed during the operation. Some surgeons suggested to me to do the curetting before attaching the stomach to the abdominal wall. They thought that this plan would enable the operator to have the left hand on the outer or peritoneal surface of the tumor while the right hand was using the curette within the stomach, the incised portion of the stomach to be held entirely outside of the abdominal cavity during the whole operation of curetting, something after the manner of Richardson in his celebrated case of gastrotomy for removal of a denture from the lower part of the œsophagus. I cannot adopt this suggestion for several reasons:

1. The hand is introduced immediately after the first incision and makes a thorough exploration of the external surface of the stomach, thus giving the operator all the knowledge he needs concerning the condition of the serous and muscular coats of the stomach over the tumor.

2. It is difficult to hold the stomach so securely outside of the abdomen, while working inside with the curette, that none of the juices or particles of *débris* will infect the wound. In order to hold the stomach entirely outside of the abdomen a much larger incision is necessary than is needed for my plan of operating.

3. By using cold water injections the stomach can always be made to contract to such an extent that any part of it will be made easily accessible to the curette and to the fingers, or even to the eye, if necessary, through the fistula. In both of my cases I could easily have reached into the cardia with the point of my finger after the use of the ice water, and that is certainly the most distant part from the incision made by me.

4. By first carefully suturing the stomach to the abdominal wall, the organ is securely fixed and all manipulations on its inner surface are very much facilitated.

The operation of gastrotomy with the intention of dropping the stomach back into the abdomen, after having scraped away a malignant tumor and closed the stomach, was well considered by me, but I would not advise its performance for

the obvious reason that a recurrence is always expected which would require repeated laparotomies. On the other hand, having an artificial opening into the stomach we can prevent the return of obstruction at the pylorus with rapidity and safety, thus obviating the terrible death by starvation which might otherwise be the fate of our patients. Besides, the artificial opening permits of local treatment by means of caustics, drainage, disinfectants, etc., in a manner simple in execution and efficient in its application.

In certain cases the surgeon will be agreeably disappointed in finding a benign pedunculated myoma, lipoma, villous condyloma or simple mucoid polypus. In such a case or in case a hair tumor should be found within the stomach, as in Thornton's case, the immediate suture of the stomach incision would be proper. In this emergency I would advise the cutting of the sutures which form the fistula, and the immediate closure of the stomach by Czerny-Lembert sutures. I do not think that the thread-holes in the stomach would in any way militate against the healing by the first intention. This complication is not likely to happen because a benign tumor will in all probability be diagnosed from malignant neoplasm after laparotomy and previous to opening the stomach; or, at least, before the second tier of sutures is applied for the establishment of the fistula.

The question as to the effect of the gastric juice upon the raw surface which will be left within the stomach gave me considerable anxiety in my first case, and I had thought of using alkaline water to neutralize its effect. The remarkably favorable course of both cases, however, as well as the experience of other surgeons in plastic operations on the stomach seem to indicate that this fear is not well grounded and that the gastric juice has scarcely any effect upon living tissues, well supplied with circulating blood.

The only operation which comes into direct competition with the one here described is gastro-enterostomy because it has been performed in exactly the same class of cases for which I would recommend my operation. At the Congress of German Surgeons in 1885, von Hacker says of Wölfler's operation (gastro-enterostomy) "out of our eight cases of cancer of

the pylorus, death followed immediately upon the operation in five and one died a month afterwards of tuberculosis and marasmus." \* \* \* "In general, the results of the operation cannot be called favorable." \* \* \* "*In cases of carcinoma the aim of the operation is not very high, it is intended only to give a short prolongation of life, free from the tortures of obstruction.*"

*This is exactly what is intended by my operation, and I think that the percentage of mortality, judged by the results of gastrotomy for obstructing cancer of the œsophagus, and by the improved methods of operating, will be a very small one.*

*The operation is indicated in all cases of pyloric cancer, with stenosis, in which the radical extirpation is impossible on account of adhesions to neighboring organs or infiltration of the lymphatic glands. It will be found proper to do my operation in the ratio of about twenty cases to each one suitable for pylorotomy.*

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UPON SOME ABNORMAL CONDITIONS WHICH  
MAY COMPLICATE THE OPERATION OF  
COLOTOMY.<sup>1</sup>

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THE operation of colotomy has not yet been practiced often enough to make us acquainted with all its possible difficulties; and it is for this reason I wish to make a few observations upon the subject. In August, 1884, I was asked to see, in consultation, a lady who was the subject of malignant disease of the rectum, and who had been suffering from complete obstruction for about a fortnight. She was very much exhausted, the abdomen was greatly distended, and although she occasionally was able to get rid of some flatus, the total amount was so small that her distress was in no way relieved. I made a prolonged attempt to pass a urethral bougie through the minute central canal which I could feel in the nodulated mass in the rectum, but without success. The effort had already been made on a previous day with a like result; and as the symptoms were urgent I recommended that the colon should be opened on the left side. This was accordingly undertaken August 15, when I had the assistance of the late Dr. Benjamin M'Dowel, Mr. Thornley Stoker, and Dr. Kavanagh, of Kingstown. The incision was made midway between the last rib and the crest of the ilium, the centre being about half an inch behind the central point of the iliac crest, as recommended by Allingham. The parts were very carefully divided to the full extent of the wound in the skin, and finally the transversalis fascia was cut through. We were now in a position to search for the gut, and I looked for it in its usual position at the posterior extremity of the wound. Instead of finding, however, a large distended colon, there was a tube about the size of a small intestine. I examined it carefully.

<sup>1</sup>Read in the Surgical Section of the Academy of Medicine in Ireland, May 20, 1887.



It was somewhat thicker walled; but it did not present any of the longitudinal bands characteristic of the colon; neither had it the greenish color, nor did it contain any material that could be recognized as *fæcal*. I next explored its relation to the kidney, and it appeared to lie in close proximity to the lower part of that gland. The tube was not in any degree tense; but what it was that had got into this place none of us could tell. Finally I punctured it once or twice with a needle, but nothing escaped. In front of it lay a larger gut, to which I now turned more particular attention. It did not present the greenish color upon which so much stress is laid as enabling us to identify the colon; neither were the longitudinal bands visible; but a deeper examination of its attachments showed that it was connected to the posterior abdominal structures in the usual position of the colon, and we determined upon opening it. I rolled the gut so as to get at its posterior surface uncovered by peritoneum, but I found that this membrane almost enveloped the intestine. In my efforts to get at the back of the colon I opened into the abdominal cavity, but I sewed up the rent with carbolised catgut and it never gave me any trouble.

I first transfixed the sides of the wound and the colon with a large needle in two places, and the intestine was then opened so as to allow the loops to be drawn out. These were divided, and the opening was secured to the external wound by four silk sutures. Catgut was used to secure the intervening portions of the edge of the intestine to the skin. A copious discharge of *fæces* followed. The dressings consisted of iodoform and pads of wood wool; The wound healed without any difficulty. The patient was able to go to the drawingroom in a fortnight, and to go out soon afterwards. She remained in fairly good health, and did not suffer any special inconvenience from the opening in the colon. Death followed in 21 months, rather suddenly, and was believed, I understand, not to be the direct result of the disease in her rectum.

Now, the point of greatest interest in this case is the position of the colon. The universal teaching of the books that I have consulted is that the colon is to be found at the most posterior point, and it was owing to this that we prolonged our

examination of the strange tube which none of us could identify, and which perplexed us so much. Some time ago, with a view to solve the difficulty, I made an inspection of a frozen transverse section of the body, which was made by Professor Cunningham, of Trinity College, and a drawing of which has been kindly made for me by Dr. Arthur Thompson, Professor of Anatomy at Oxford. The section passes through the third lumbar vertebra. You will observe on examining it that the colon lies in front of the quadratus lumborum muscle, covering the greater part of that structure, but that on the remainder of this surface, and lying between the colon and the line of incision, is a section of intestine, which, from its internal structure, is to be recognized as the jejunum. In fact, the colon is hidden in a somewhat quadrilateral space, the boundaries of which are, quadratus lumborum posteriorly; intestine externally; intestine anteriorly; and psoas internally. If an incision for colotomy were made in this case, we should come upon the jejunum and not upon the colon at all. My first impression was that I had solved the problem, and that what I saw and punctured was in reality a piece of small intestine; but it was pointed out to me that I must have opened the parietal peritoneum to get at it; and with the exception of the small opening which I accidentally made subsequently, I was not conscious of having done so. I could not have done so, if this tube was really small intestine, without observing it, unless, indeed, the parietal peritoneum was adherent to the tube.

But a consideration of this section does suggest a difficulty which might occur, and for which we ought to be prepared. The reflection of the peritoneum in the section under examination is normal—that is to say, a portion of the posterior surface of the colon is uncovered by peritoneum. But occasionally there are seen cases in which this arrangement is not present, or in which there is, at all events, such a laxity of the peritoneal ligaments as would permit of displacement of the colon forwards. In such cases the colon, distended with flatus or solid material, could extend forwards past the jejunum, which lies on its outer side, and overlapping that portion of the intestine, appear at the

bottom of the wound second in order from the quadratus lumborum, and not first.

The subject obtains additional interest and importance from the observations of Mr. Treves, in his recent lecture on "The Anatomy of the Intestinal Canal and Peritoneum in Man" (*Brit. Med. Jour.*, March 21, 1885). In the course of his lecture on the ascending and descending colon, he remarks: "Considerable importance attaches, from a surgical point of view, to the frequency with which a meso-colon may be anticipated in connection with the vertical parts of the large intestine. With this anatomical circumstance the operation of lumbar colotomy is very intimately concerned. The usual statement made in surgical text-books upon this subject is to the effect that a mesocolon is more often found upon the right side of the body than upon the left, and this statement is used as one argument in support of left lumbar colotomy. I made a careful examination of the peritoneal investments of these parts of the colon in the 100 subjects dissected, with the following result: In 52 bodies (that is, in about one-half) there was neither an ascending nor a descending mesocolon. In 22 there was a descending mesocolon, but no trace of a corresponding fold on the other side. In 14 subjects there was a mesocolon to both the ascending and descending segments of the bowel; while in the remaining 12 bodies there was an ascending mesocolon, but no corresponding fold on the left side. It follows, therefore, that in performing lumbar colotomy a mesocolon may be expected upon the left side in 36 per cent of all cases, and on the right in 26 per cent. From the standpoint of development and comparative anatomy it would certainly be expected that a descending mesocolon would be much more frequently met with than an ascending mesocolon. In the lower animals the former membrane is always extensive and conspicuous. It is well marked in all species of monkey, and even in the anthropoid apes. It is the remains of the primary vertical fold of peritoneum, whereas the ascending mesocolon is a secondary production—a fold acquired by a certain phase in the development of the bowel. The line of attachment of the left mesocolon is usually along the outer border of the kidney, and is vertical. The attachment, therefore, has been moved some

distance from the middle line, along which it would have originally extended. The line of attachment of the ascending mesocolon is, as a rule, less vertical, and is found crossing the lower end of the kidney from right to left, and then ascending along the inner margin of the gland. In like manner, when these folds are entirely absent, the left colon will be found to be adherent to the parietes along the outer border of the kidney, while the right will be fixed a little obliquely to the anterior surface of the lower end of the corresponding gland, and then along its inner margin. The ascending mesocolon will vary in breadth from one inch to two inches, while the fold on the left side will vary between one and three inches."

I have refrained from discussing the general aspects of this operation, now so frequently successful when undertaken at the proper time; but I wish to direct attention to conditions which may hamper us greatly in the performance of it. Recognition of the colon by its position in the wound, its structure or its color, cannot be relied upon as invariably true. In this case none of these gave us any aid. Allingham, who has done between 30 and 40 colotomies, says: "In most of my cases one of the longitudinal bands was clearly observed," which clearly implies that this indication was not always apparent. Amussat found help in the ascending and descending movement of the small intestines, corresponding to respiration, the lumbar colon not participating. All these suggestions show that it is not always a simple matter to find the colon; and I have added a difficulty to which, so far as I know, attention has not been before directed. It will be found, however, that in the majority of cases some of the guiding marks are present; and I may add to these the indication which will be most persistent—namely, the position of the attached surface of the colon along the outer margin of the kidney.

The second patient whom I operated upon was an old man over seventy, who consulted me in August, 1885, for chronic diarrhoea. He had lost much in weight, and nothing had helped to stay the discharge. I examined his rectum carefully, but could not reach any obstructing mass. An examination through the abdominal walls revealed some fulness in the region of the sigmoid flexure, and above it, and I suspected that

this was the source of the mischief. He was not, however, suffering any pain; there were no indications of fæcal lodgment, and I prescribed for him, telling him to return in a few weeks. In September there was no improvement, and on the 24th of that month I was sent for to see him. He was confined to bed, the abdomen was distended, fæcal discharge had stopped for a day or two, and there was frequent vomiting, with a loaded tongue and a rapid pulse. The fulness in the sigmoid region was now very marked, and, in consultation with Mr. Thornley Stoker, it was agreed that the colon should be opened. This I accordingly did next morning, with the assistance of Mr. Stoker, and Mr. (now Sir) W. Stokes. There was some little difficulty about recognizing the colon at first, but it was first recognized by its containing a small scybalous mass, and then by its longitudinal bands. The bowel was secured as in the last case, and opened. There was, however, no escape of fæces, only of a little dark colored fluid. The wound was dressed with iodoform and cotton wool, and it healed up rapidly. The patient's condition was improved, the vomiting and flatus disappeared, and the only thing he complained of was pain in the sigmoid region, and weakness. The morning dressing, however, continued to show nothing more than a slight brown stain, and this absence of copious discharge assisted in the rapid healing of the wound, about which there was never any difficulty. I waited on patiently for some fæcal evacuation, but it only appeared in full quantity on the seventeenth day after the operation, and it afterwards came regularly. On the nineteenth day I told the patient he might leave bed on the next. When I called, however, he said he felt disinclined to get up for a day longer. That day, however, never came, for he gradually sank and died on the twenty-third day after the operation.

The only point of interest in this case is the long delay which occurred before the evacuation through the opening in the colon. It is not rare to find cases in which a few days do elapse; but so far as I have been able to consult reported cases, I have not found one in which so long a period intervened as in this instance. Whether the cause was atony of



the bowel, or some pressure exercised by the growth, I cannot say.

I was not anxious to be active in treatment, seeing how well the patient was during the time. But in any case it is well to record the fact I have here stated, as one of the unusual conditions which may attend the operation of opening the colon.

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## MALIGNANT TUMORS OF THE UPPER JAW.

By WM. TOD HELMUTH, M.D.,

OF NEW YORK.

THE sarcomas which affect the jaws, especially the upper, form an interesting study both from a clinical and pathological standpoint. The prolongation of the Schneiderian membrane into the antrum, introduces an element into the centre of the superior maxillary, which is not found elsewhere in the skeleton, and thus renders it obnoxious to one or other of the many forms of carcinoma, that is, if we accept the theory regarding the epithelial origin of cancer.

The old primary malignant bone growths are of the connective tissue, and are sarcomas, as all the elements which enter into the formation of bone, even to the endothelial lining of the vessels belong to the connective tissue. In my opinion, it is at present impossible to correctly classify sarcomas, and if the microscopists be allowed to continue, their divisions, subdivisions and re-subdivisions of these tumors, and if it be true that every organ in the body has a sarcoma belonging to itself arising from different causes, and that "in order to discover the relative importance of these causes, the tumors of each tissue and organ must be studied separately,"<sup>1</sup> and if each pathologist is allowed to make his own arrangement, it will be perceived what a terribly conglomerate and labyrinthic affair will such an arrangement ultimately become, especially when it is remembered, that in the natural history of all tumors, one variety

<sup>1</sup>Sarcoma and Carcinoma. By Henry Trentham Butlin, F.R.C.S., p. 11



is liable to run into and overlap another. The minute diagnosis of sarcomata may be the delight of the microscopist, but is an abomination to the clinical surgeon. It cannot be otherwise than that uncertainty must always envelop these histological classifications because half a dozen of the so-called varieties of cells will often be found in one tumor. I have known spindle-cells, round cells, giant cells and even alveolar structure to exist in one jaw, and hanging to the end of the tumor, three perfectly innocent myxomatous growths, formerly called fibro-cellular (Paget), or more commonly nasal polypi.

The truth is, that in these far reaching days of science, the clinical or practical diagnosis of neoplasms is likely to be swallowed up by the more scientific and theoretical arrangement. Scientifically, the pure histological classification would be the best, if any agreement could be arrived at as to the nomenclature by the prominent microscopists of the world, which at present appears impossible and students and practitioners flounder from one authority to another in vain endeavoring to arrive at the truth. From these facts, as Müller has well said, "the microscopical and chemical analysis can never become the means of clinical diagnosis. It would be ridiculous to wish or to suppose this possible."

The surgeon desires to make his diagnosis before he cuts out the tumor; the microscopist delivers his opinion—in the majority of instances—after its removal, and if two of the latter scientists procure sections from the same tumor, there will be no guarantee that their examination will present a similarity of cell. Butlin says "since no physiological prototype of either of them (sarcoma and carcinoma) actually exists, it has been possible for each pathologist to decide for himself individually as to the grounds on which a distinction should be made." This is most true. I have known two sections of an abnormal growth to be made within twenty-four hours of each other and sent for examination to a professed expert. For one the report was, "innocent;" from the other, "malignant." I have sent three specimens of a tumor to three distinguished microscopists, and in due time have received answer from one, that

<sup>1</sup>Billroth, Classification, Diagnosis and Prognosis of Tumors.

the growth was highly malignant; from the other two that it was perfectly bland. I have sent specimens of sarcomas to three microscopists, and have been informed by one that the growth was round celled; by another that it was (giant-celled) myeloid, and by the third, that it a bounded in caudate spindles with some alveolar structure. All of these last reports, no doubt, were true, the character of the cell varying in the different portions of the tumor from which the sections were taken. A sarcoma—to simplify matters—is a connective tissue tumor, filled with embryonic unripe cells—the nearer these approach the transitional and imperfect type, the more malignant the growth; the closer the resemblance to the normal standard (speaking according to the English classification and not that of Virchow) the more homologous the tumor. It makes little difference to my mind whether these cells are spindle-shaped, round, caudate, giant-sized or minute. I (especially in the upper jaw) always expect *recurrens in loco eodem alioque* and the ultimate death of the patient, especially if the disease is somewhat advanced at the time of operation, for although Gross in his exhaustive article has given a certain percentage of recoveries after operations for sarcoma of the long bones,<sup>1</sup> I am persuaded that the mortality after operations for jaw sarcomas is greater than that resulting from similar performances on the long bones. The conformation of the upper jaw, the immovable sutures by which the bones are united, favor extension of disease by continuity; this, with the large surface covered by epithelial structure both within and without, render it liable to every form of tumor, both homologous and heterologous. The projection of the fangs of the teeth into the alveoli thereby favoring the extension of primary dental affections to the bone, is another factor in the production of neoplasms of the jaw, and the certainty of their recurrence may be in a measure owing to the impossibility in some cases, to remove from the inequalities and sinuosities of the passages, every implicated cell; even the hot iron escapes them, be it ever so carefully employed. The malignant tumors of the superior maxillary that have come under my personal observation have been ten

<sup>1</sup>American Journal of the Medical Sciences. July and October, 1879.

in number. Of the lower jaw I have treated three and operated upon two—all of these latter were sarcomas. Of course exostoses, caries, necroses and epules are excluded from this list, as are also the different forms of polypi, all of which diseases are more frequently encountered by the surgeon than sarcomas and carcinomas. Of the upper jaw tumors, speaking only by the clinical classification (for some of these cases occurred to me before the universal use of the microscope, six were myeloid (giant-celled sarcomas), and four were carcinomas; I am disposed to believe encephaloid. Although at the late stage in which they came under observation, it was impossible to make a very clear diagnosis, except where the fungous (fungous hæmatodes) growth with profuse hæmorrhage tended to confirm such a conclusion.

As the main object of this article is to point to clinical rather than microscopical facts which may be of service to the surgeon before he subjects his patient to operation, I cannot better detail the symptoms than by presenting them as they appeared in those cases which continued under observation and were operated upon; these were five in number, four being myeloid and one encephaloid. Of the five others whose cases did not present any encouragement for operation, I can only find any record of two, both of whom died within ten or twelve months. No doubt as is usual with such patients, the remainder moved from one surgeon to another, from cancer curers to astrologists, and from thence to hospitals, where they died. In the preparation of these cases I have endeavored to point out the leading characteristic clinical symptom and to recall the impressions they made upon my mind at the times when I was endeavoring to make my diagnosis.

CASE I.—I. V., æt. 49 years. Entered the Good Samaritan Hospital, St. Louis, on account of a tumor involving the upper jaw of the right side, and extending downward and forward into the mouth, forcing out the alveoli and teeth and growing with amazing rapidity. The tumor was turned to the left side and protruded sufficiently to evert the lower eyelid of that side. An oral examination revealed an irregular mass, resembling in many respects the gum from which it appeared to grow; it never bled, excepting after severe handling and then

but slightly; had rather a heavy but not carcinomatous odor, and appeared to involve the whole bone except the orbital plate. The patient's health was failing and an immediate operation was advised. On March 16, 1870, I removed the entire jaw, turbinated and palate bones. A different incision was made from that now generally adopted and the cut commenced at the right commissure of the lip and passed, with its concavity looking toward the nose, up to a short distance above the zygomatic arch in front of the ear. The second incision began at the termination of the first and continued under the eyelid to the nasal bone. The bony connections were divided with saw and pliers, the attachments severed in the usual way, and the tumor twisted out with Fergusson's forceps. The alveolar process of the left upper jaw had also to be cut away. Hanging to the posterior surface of this growth were *three good sized ordinary nasal polypi*. There was no severe hæmorrhage, but the operation was tedious and the patient suffered from shock. He soon revived, however. The wound—as all facial wounds do—healed with remarkable rapidity, and I saw him two months after the operation, apparently completely cured, attending to his business. Upon examining the oral cavity, I could see no evidence of return, and yet I am disposed to believe from my subsequent reading and experience that the disease sooner or later made its appearance and ultimately destroyed his life. The diagnosis was “a subperiosteal myeloid tumor.” The clinical points upon which the opinion can be given are, I think, these: (1) There was no infiltration; (2) no fetor; (3) no hæmorrhage; (4) the integument covering the growth was healthy; (5) no glandular enlargement; (6) the naked eye appearance was similar to epulis;<sup>1</sup> (7) small portions of the tumor removed before the operation and cut carefully through, presented a striking similarity to suet or to be more precise, to a bit of marrow which, having been boiled, has been allowed to cool. This in itself is almost pathognomonic (*μυελος ειδος*). In this case the clinical symptoms were exceptionally perfect and the diagnosis comparatively easy.

CASE II.—Mrs. W., æt. 42 years, applied to me for removal of a tumor situated on the anterior face of the left superior maxillary. It was soft and spongy, not very vascular, but was growing with considerable rapidity; it was not pedunculated, but sessile and very flat; some months before I had removed a somewhat similar looking, though

<sup>1</sup>The late John Mason Warren, in his “Surgical Observations,” P. 64. makes the following remarks: “Myeloid tumors of the jaw at a late stage their existence are often distinguished with difficulty from that external affection called epulis.” In these days some authors style the giant-celled sarcoma as malignant epulis.

smaller growth, from the same locality and scraped the bone, supposing the tumor to be an ordinary fibrous epulis. I therefore snipped off a portion of this tumor, and sent it for examination to a specialist. The report informed me that the growth was "a giant-celled sarcoma, etc." I therefore set about performing a more thorough operation which was done on October 4, 1872. A portion of sound bone was removed with Hey's saw and the pliers, after dissecting the entire lip away. There was no further trouble, and a letter, bearing date August 11, 1887, informs me that there has been no tendency to return, the coming October being fifteen years since the operation was performed.

In this case the operation, although thorough, was small in comparison to those necessary to remove the entire bone. Nevertheless, the length of time that has elapsed without recurrence goes far toward establishing a precedent for early operation as well as the necessity of cutting through healthy bone in the removal of sarcomas.

CASE III,—This case was somewhat difficult to diagnose as to its specificity when brought to notice, but as to its malignancy there could be no doubt. It was a bad case to look at. The patient was 53 years of age, and when I saw him first in May 26, 1885, he had a tumor as large as a small-sized cocoanut projecting from the left side of his face. The skin covering this was inflamed and of a dusky hue, with an ulcerating spot in the centre. Herein lies one of the difficulties in making up the diagnosis between sarcoma and carcinoma. Was this redness that belonging to infiltration characteristic to cancer? or, was it due to the stretching of the integument due to the size of the tumor? In case No. I, the tumor was not so large, but the integument was of good color, this being a characteristic of sarcoma. The history of the case was this: about three months before the above date a swelling appeared in the left cheek, which increased rapidly until, supposing it to be a gum boil, it was lanced, discharging very little pus, but a good deal of blood. From this period the tumor grew with great rapidity, until it reached its present size, closing the left eye, rising above the left zygoma and projecting into the mouth at least half an inch below the cutting edge of the teeth on that side. The surface was soft and hard in spots, and here and there, the sensation presented was that of chondrifying sarcoma. The patient was in a terrible state of depression. He was told exactly the nature of the operation and what was to be expected; was advised to return home and take the advice of his relatives and friends and to write the results. Instead of writing he came in person and the operation was performed May 3, 1885. Tracheotomy was first done, the pharynx filled with sponges, the ether admin-



istered through a long tube fitted to the canula to prevent explosion during the use of the cautery. The incision was through the upper lip, around the nose to the inner canthus, and under the lid to the zygoma. This operation was long, bloody and tedious, the effort being made to make it as thorough as possible. The entire superior maxillary, palate and malar bones were extirpated, and though the patient required many hypodermics of brandy and ether, he did well. His rapid recovery surprised all who had seen him. He left New York for his home, where he was able to walk and drive and began to hope for a more perfect restoration, when in the hot weather in August he began to fail, and died of exhaustion on September 17, 1885. This case was one of encephaloid cancer beginning within the antrum without known cause. The patient lived not quite four months after the operation and was satisfied that his sufferings had been so much relieved, and that his life had been prolonged some months, free from that intense suffering that had characterized the disease before the bones were removed. This tumor—encephaloid or medullary—was not difficult to diagnose after its removal. The great bleeding, the entire involvement of every structure entering into the bone and cheek; the intense infiltration and glandular enlargement were the clinical symptoms—its naked-eye resemblance to brain matter also would class it as medullary tumor, although to be more advanced it should be demonstrated as “the soft variety of spheroidal celled carcinoma.”

CASE IV.—Mrs. M. C., aged 43, presented herself to me in November, 1885, with a tumor about the size of a small filbert projecting between the central incisors of the upper jaw; the gum had receded, the teeth were loosened and there had been occasionally slight bleeding. Otherwise there was nothing unhealthy about the woman. Here was a growth which I decided was a fibrous epulis, meaning thereby a fibroma, which sometimes may contain spindle cells which renders it liable to return. This tumor was cut off after the subcutaneous injection of cocaine, the periosteum removed and the bone scraped. The wound healed readily and the patient returned to her home in the country. On January 7 of this year she returned with the tumor re-appearing, extending backward to the roof of the mouth and up along the nasal process of the superior maxillary, pushing out the lip and somewhat disfiguring the face. After etherization, I introduced a long knife under the lip and around the tumor, carrying its blade nearly to the internal canthus. This was followed by a profuse hemorrhage, which, after a time, was arrested by steadily pressing the nostril with the forefinger and thumb. Upon exploration I found the anterior



face of incisive fossa entirely destroyed, and the root of the nasal process also. To get at the healthy portion of the bone the cheeks had to be liberated from the jaw, and then, with a chisel and mallet, I removed the whole anterior face of the bone, the alveoli and the root of the nasal process. The specimen was examined and the diagnosis given of giant-celled sarcoma. Whether there will be further reappearance of the tumor I cannot say, but I am pretty certain that it will return.

CASE V.—This case is one of peculiar interest, because of the mixture of growths found in the bone and surrounding cavities. J. L., æt. 52, was sent to me on November 10, 1884, with a large tumor on the right side of his face. Three years before he fell, striking his spine upon a step. This greatly prostrated him and from that period he noticed an obstruction in the left nostril. In July, 1886, he applied to a surgeon who removed two nasal polypi at intervals of two weeks and towards the end of August others were extracted from the posterior nares. I mention these clinical facts to call attention to the presences of myxoma—fibro cellular, homologous or (whatever term may be necessary) polypoid growths, in connection with the sarcomas. This fact was also noted in Case I.

Upon examination I found a smooth, round, elastic tumor on the right side of the face, pushing forward the orbit, almost closing the eye and discoloring the lid. The integument covering the tumor was in a high state of inflammatory action. From the presenting symptoms an abscess of the antrum was suspected, therefore. A tooth was removed and the cavity explored. It was found diminished in size, but there was nothing but blood discharged, but I now discovered a growth blocking up the posterior nares. The abscess proved to be in the tissues covering the tumor and was opened at the external canthus of the eye, and about two and a half ounces of very fetid pus were discharged. In a day or two all the immediate symptoms were ameliorated, the swelling decreased, and the eye could be opened to very near its natural width. The exact size of the tumor could be made out. On the inside of the mouth there were no dendritic vegetations, the gum was not even reddened, though somewhat spongy, but there was a certain elasticity which was unnatural. There was neither adenoid or other surrounding inflammation. On November 19, 1886, I slit up the nose in the median line, dissected up the cartilage on the right side, and by means of a lithotomy forceps (which by reason of its spoon-blades was found very convenient) I removed a large fibroid polypus, occupying the nares on that side, and which from its pressure

had opened the wall of the antrum, from which with a scoop I removed a mass of soft pulpy material which was—to say the least—very suspicious in appearance. The entire cavity was then thoroughly cauterized and the parts washed with a solution of the permanganate of potash. The wound healed rapidly by first intention, and the patient went home much improved only to return in two months in a worse condition. There remained now nothing to be done but the complete extirpation of the bones on that side of the face. Mixed anæsthesia was used. Tracheotomy was performed, and as sometimes happens, there was some troublesome hemorrhage. The incision was the same as in Case III, through the lip, around the nose under the eye. The man was very weak after the operation, but rallied well and went home on February 23, 1886, apparently cured. The respite was of short duration. After six months the swelling began to return, this time without pain. He did not take to his bed until four days before his death, which occurred ten months after the second operation. The tumor proved to be central round-celled sarcoma, with many giant cells scattered throughout its structure.

From these cases the following clinical deductions may be drawn without regard to the microscopic examination, and though the number presented is very small, yet the conclusions arrived at may be of service in assisting others in preparing tables and experiences which ultimately may be of positive value.

1. Giant-celled sarcomas (myeloid tumors) are prone to affect the upper jaw more frequently than any other malignant growths.

2. The subperiosteal tumors are in their early stages difficult to diagnose from ordinary epules (fibrous and homologous).

3. Sections of the latter are much firmer than the former and contain more fibrous tissue.

4. Cut surfaces of myeloid growths resemble very closely sections of bits of marrow or suet.

5. Myeloid tumors do not bleed readily, in fact, can almost be handled with impunity, so far as bleeding is concerned. This experience is not that of some authors, but it is mine and must go for what it is worth.

5. The integument covering sarcomas of the jaw does not

infiltrate, marking a strong clinical contrast in this respect with carcinoma.

6. The integument covering sarcomas of the jaw is liable to inflame and suppuration and ulceration to ensue from distention and pressure of the diseased mass beneath. When this complication occurs the difficulties of diagnosis are materially increased.

7. The fibroid epulis is liable to degenerate, and at each recurrence to become more malignant.

8. In the majority of cases sarcomas of the upper jaw are very liable to destroy life—death generally occurring from asthenia.

9. The earlier and more complete the excision the longer the interval of immunity.

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#### A CASE OF CHRONIC CEREBRAL ABSCESS (ANTE-MORTEM DIAGNOSIS).

By A. R. JENKINS, M. D.,

OF HENDERSON, KY.

WAS consulted on August 25 of this year by John Reeve, white, male, æt. 26 years, on account of a swelling on the right side of his head. Found colossal fluctuating tumor filling out the right temporal fossa and fascia. Opened abscess behind the ear and into the mouth at processus coronoideus. About half a pint of thick, mushy, odorless pus discharged. Could find no erosion of temporal bone either with finger or probe. Insisted on chiseling into the sinus mastoideus, but patient refused. Disinfected and drained lege artis.

Anamnesis—latent stage. About one year ago patient suffered from pain and swelling around and behind the right ear. Shortly afterward he had a purulent discharge from right ear which has run continuously until the last two weeks, when the abscess began forming behind his ear and since which there has been no discharge from the ear. Right mem-

brana tympani gone; dry, congested granulations in middle ear; complained of severe general headache, intermittent, no dizziness, nausea or vomiting during exacerbations of pain. He complained bitterly of a painless, restless insomnia—free from hallucinations however—of frequent difficulty in swallowing, and of a large and disagreeable secretion of saliva; said this was his most distressing symptom.

Patient had a vacant, pathological expression of countenance, said he had frequently used morphine in the last two weeks; was garrulous and slightly incoherent in conversation: being unacquainted with his mental peculiarities this was attributed to whiskey and morphine. In each day's progress during the last week in which he lived there seemed to be developed a more and more erratic psychosis. Paraphasic peculiarities are now recalled that existed in his speech, though little stress was laid upon this at the time. Altogether, his conversational nuances were uncertain, chaotic and eminently monotonous. Temperature statistic irregular, intermittent, having  $103^{\circ}$  for maximum. Quinia in large doses had no marked control, and still the temporal subfascial abscess was behaving faultlessly. During this time he insisted for the most part on not being confined to his room or bed. Terminal stage—exactly one week after the external abscess had been opened he awoke in mild delirium, recognized me when I spoke to him; pulse 50 to the minute, intermitting one beat after each third beat. Respiration 25, with decided stertor; temperature,  $103^{\circ}$ ; lessened knee jerk on left side. Slight hemi-anæsthesia to left side, does not notice pin pricks on this half; does upon the other side, pupils symmetrical and correspondent to sunlight. He occasionally rose from bed and stood alone, constant and large flow of saliva from right side, uvula drawn to left; tongue also drawn to this side, apparently could not swallow; faucial anæsthesia and muscular paresis decided. A feather introduced in fauces produced no reflex. Articulation lame and uncertain, very restless tossing of arms and head.

Two hours later, slight general anæsthesia most marked on either side, muscular sense ditto, tendo-reflex in abeyance, right pupil dilated, pulse normal and strong, respiration 26,

stertor pronounced, saliva chokes and has to be mopped out, he seems unable to speak, though apparently temporarily in a degree at least conscious, for instance tries to use cuspadore when presented and reminded to spit, ataxic aphasia (?), conjunctiva and face injected, right conjunctiva and general Schneiderian membrane anæsthetic, only left eye blinked when filiped on the nose, muscular apparatus of right eye seems impaired. Was told now for the first time that the patient had in the last eighteen months undergone a complete metempsychosis from having been grave and quiet he had become as above indicated. Made an exploratory drill opening into mastoid cells (without an anæsthetic), but found no pus, then advised and insisted that he be trephined through the temporal bone, the point elected being on the pars squamosa, midway between the meatus auditorius and the squamous suture, but the operation was not permitted. The hope was that 'by this portal, a large abscess with probable congestion and œdema could be reached, which was hypothecated to be in or on the temporal lobe of the brain. For from the symptoms that have been mentioned, and others, it seemed that other cerebral lesions which might present similar or confounding symptoms could be excluded—as convex or basilar meningitis, phlebitis or thrombosis of sinus with meningitis, occipital abscess, tumor, etc. Some of the favoring diagnostic points were, the history of chronicity, the peculiar fever phases, the recent and remote and continued evidences of pressure on certain striæ of capsula interna of right hemisphere. The main indices, however, that were regarded, were the comparative absence of symptoms of local cerebral disturbance—on the anatomical relation and the pathological history of such ear troubles and such abscesses of temporal lobe; for instance, the observation of Heinecke, of the relative greater frequency of abscess on the right side in aural inflammation. The very absence of symptoms was considered to be of affirmative value, for this absence of symptoms is one of the peculiarities of lesions in this inane cerebral continent. "The loss of brain substance in the temporal lobe which abscesses of the brain necessarily produce, is not sufficient according to experience to call forth important symptoms.' the case con-



tinued, the symptoms of cerebral œdema and intra-cranial pressure gradually increasing, when suddenly the next day at near 12 o'clock, A. M., the case assumed the severest phase, his pulse which shortly before had been 90 became 125, respiration of the Cheyne-Stokes type, universal paralysis of motion and sensation; absolute conjunctival anæsthesia, total absence of patellar reflexes, complete cutaneous insensibility. This was about thirty hours from the initiation of the terminal stage—about ten before his death. The case presented no convulsive phases in any part of the attack. Last reckoning of radial pulse 160—in status exodus lethalis.

Obductio capitis—found scarcely no remains of sub-fascial abscess, no superficial necrosis or softening of temporal bone discovered, nor of mastoid angle of occipital. Tabula vitrea externus of mastoid thickened and eburnated. Cellulæ mastoidei full of pus, several caseous and floccular foci (osteo-myelitis tuberculosa). Between pars squamosa and dura two small abscesses the size of peas and communicating with superior cells. Dura thickened and of a muddy, yellow color (pachymeningitis externa purulenta). On inner surface of dura a thickened organized deposit, agreeing in size and location to epidural abscesses, reddish-yellow in color (pachymeningitis interna fibrosa et vasculosa). Brain rises to edges of opening. Pia thickened and cloudy, but not adherent to dura or brain (arachnitis superficialis fibrosa). Cortex cloudy, yellow color and œdematous (gelbes œdem?) The gyri had lost of both their rondure and contour. Sulcus temporalis medius almost obliterated. Abscess tapped at a depth of one and one-half centimetres of size and of shape of a hen's egg. Strong connective tissue capsule offers a resistance of probably two or three pounds to index finger. Abscess contents of a greenish-yellow color, viscid, acid reaction. Rupture into right lateral ventricle into posterior horn. It lay for the most part in the temporal lobe and to a large extent superficial, just under cortex. No involvement of cortex of convexity. No direct pus connection between abscess of brain and epidural abscess discovered. As a point in clinical casuistry it is a question whether the osteomyelitis of the mastoid process was primary



and precedent to the otitis media, for if so it is likely that the abscess of the brain was several months senior to both the otitis media, and the pain and swelling that first came behind the ear; in other words, it abscessed the brain before showing externally. The case is certainly an excellent exemplar for the necessity of prompt and radical exploration, and raises the question if it is not the truest conservatism in such cases (as in the abdomen) to explore at once.

## EDITORIAL ARTICLES.

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### THE TREATMENT OF SCOLIOSIS BY MEANS OF MASSAGE.

The results obtained from the employment of massage in carefully selected cases of lateral curvature of the spine seem to have been so successful that they deserve more than a passing notice. Dr. Landerer's paper on this subject, together with the discussion of the same at the Congress of the German Society for Surgeons,<sup>1</sup> are worthy of our consideration. Our author regards habitual scoliosis as that arising from superincumbent weight as genu valgum sometimes does, the weight pressing bones and joints in wrong directions and ultimately causing anomalous growth. It is in the earlier stages of this form of scoliosis that he has found massage to speedily bring about recovery, and in the later stages where the deformity has become fixed, intercostal neuralgia and painful tension of the muscles are relieved, and the patient made comfortable by the same means. This form of scoliosis is to be kept separate from the static, rheumatic, traumatic, empyematic and other kinds, in which it would be well to include that arising from disturbance in the central nervous system.

The production of the natural curves of the spinal column is clearly explained. In early childhood the spinal column is straight. The normal S curve arises from the combined effect of gravity and muscular action, the former alone would cause a simple backward curve, a total cyphosis; the latter modifies this and forces it into a serpentine curve. The action of both is to shorten the spinal column. While our observation would agree with that of the author, that marked serpentine curves, especially deep lordoses in the lumbar regions are frequently found in those of great muscular strength and in stout people of me-

<sup>1</sup>Deutsche Zeitschrift f. Chirurgie. Band XXIII, Heft. 5 und 6.  
Deutsche Med. Zeitung. No. 32, p. 539.

dium stature, we would beg to differ from him in his statement that those who are tall and slim spare their muscles by throwing the centre of gravity of the upper part of their body as far back as possible. More often the latter stoop or are round-shouldered, and when they maintain an erect attitude the absence of marked curves may be owing to the muscles not being sufficiently strong to curve and shorten the spinal column.

The upper and lower extremities of the cervical portion of the spinal column are approximated by means of the muscles at the back of the neck, the contraction of which changes the former convex backward curve of infancy to a concavity. This result is aided by the effort to maintain the centre of gravity, for the middle and lower parts of the cervical region carry the most of the weight of the chest. The thoracic organs and even part of the weight of the abdominal organs are suspended from the first and second ribs and from the region of the sternum to which these are attached, and these again are held by means of the scaleni muscles and by them raised during inspiration, so that the weight of the thorax is transferred to the middle and lower cervical vertebræ where these muscles are attached.

As the dorsal region of the spinal column has but little strain upon it in either direction it remains convex posteriorly as in infancy. But it is otherwise with the lumbar region which becomes convex anteriorly owing to the action of the large muscles on its posterior aspect which changes the previous backward convexity into a concavity. The lumbar region carries the major part of the weight of the intestines; it is here that the mesentery is attached and also the psoas muscles. These muscles, when the thighs are fixed as in standing and still more in assuming the erect position, make a downward pull upon the lumbar vertebræ in the same manner as the scaleni muscles do upon the cervical portion, thus necessitating a strong counterbalancing action from the muscles on the posterior aspect.

The explanation of lateral curvature is not so easy. Slight lateral deviations are frequently found in otherwise well formed people, and according to our author it is not agreed whether this should be called physiological scoliosis or not. We would at once anticipate his con-

clusion by inferring that this gives no trouble so long as the muscles are strong and active, and that therefore measures to prevent or restore their strength and activity should be employed. Amongst classical statues in the Louvre and British Museum Dr. Landerer has not been able to find any examples of the physiological scoliosis. The spinal column being freely balanced perpendicularly upon the pelvis and thus held by the muscles on each side of it, as a freely balanced mast would be by ropes, it follows that when deviation occurred to one side or to the other it must be on account of muscular relaxation, as the mast would deviate if one of the ropes were slack. Increased weight in the perpendicular direction alone does not cause lateral deviation. The effect of gravity upon superincumbent or suspended weight will not produce scoliosis so long as the muscular structure is normal.

In Swabia, where the home of our author is, he tells us that women and girls carry heavy loads upon their heads up high mountains, but in spite of this scoliosis amongst the laboring classes is seldom met with. On the contrary, very prettily formed figures are almost exclusively found due in great part to this exercise. The maidens of Capri also carry heavy weights upon their heads and are remarkable for their faultless development. The muscles are thus made powerful to oppose strong lateral resistance.

In incipient scoliosis the spinal column is exceedingly flexible and this great mobility should be regarded as the first sign of lateral curvature, especially when accompanied with flat back,

Autopsy of scoliotics reveals atrophy and fatty degeneration of the muscles of the back, especially of the concave side. We would have supposed that it would be greater upon the convex side where the relaxation would be.

We are all more or less critical in observing any slight obliquity of the shoulders and lateral deviation of the spinal column, but somewhat indifferent towards the antero-posterior direction of the median curve. Only in the most recent ladies' fashions does our author find that a well developed median curve is necessary and that a deep concavity in the lumbar region—lordosis—is pretty. The latter is formed artificially by the bustle or *tournure*.

In health the antagonistic muscles keep the vertebræ at proper distances from each other; If there be muscular weakness they will sink down upon one another, and in sitting or standing if the muscles act obliquely the spinal column will deviate from its natural position and the vertebræ will be pressed together causing disturbances of their circulation and nutrition until they finally become deformed. In brief, *for the preservation of the spinal column in a natural position healthy muscles are necessary. Habitual scoliosis arises from superincumbent weight, the original cause of which is weakness of the muscles and therefore the treatment has to be directed to them.*

The results of treatment proved to our author that his views were correct. Massage goes further than gymnastics, and what these accomplish slowly massage does in a direct manner by the hands of the surgeon. With cases of scoliosis in the first stage which permanently increased in a few months, the children felt stronger and steadier in the back and held themselves more erectly even after a few *seances*. Though the immediate effect of massage was quite evident, yet part of the improvement disappeared within a short time, but the gain gradually became lasting. The method employed by Dr. Landerer is the following: The child is laid upon the abdomen, the trunk bare to the lower half of the crests of the ilia, the arms stretched forwards. The extensors on both sides of the back are percussed with the balls of the little fingers from their origin on the pelvis upwards to the neck; at first gently, then more vigorously. The concave side is percussed more strongly than the convex. The muscles on the side of the trunk so far as they are connected with the spinal column come in for a share of the same. Then the extensors of the trunk are stroked with the fingers held in a perpendicular manner.

We do not see why percussion should be used more energetically on the concave side, unless it be carried to an extreme degree so as to tire out the contracted muscles and thus cause them to relax. Percussion has much the same effect as faradization, and can be used in moderation to stimulate muscular contractility. Our method of percussion in such cases differs somewhat from our author's, for seeing that lateral curvature may not only be favored, but actually produced

in those predisposed thereto by persistently sleeping on one side with high pillows under the head, a great part of the treatment should consist in having the patient lie upon the opposite side so as to reverse the curves. And it is better that most of the massage should be administered with the patient in this position, for massage helps to relax contracted muscles when they are stretched, and it stimulates the contractility of relaxed muscles. The insertion of muscles implies their attachment to the more movable parts, and as their returning circulation almost always follows the course from their insertion to their origin, it would seem much better to proceed with the massage from the neck to the pelvis. Deep manipulation, rapid pinching and rolling of the muscles have much greater influence in stimulating their nutrition and contractility than the stroking of our author which acts more upon the superficial circulation.

Dr. Landerer next uses manœuvres which act more especially upon the skeleton, the spinal column and the framework of the chest—the *redressement*. These resemble the rotation and torsion movements which have hitherto played an important rôle in the treatment of scoliosis. After this the spinous processes are acted upon by stroking from behind upwards, and by pushing them directly towards the concave side so as to equalize the curves. The immediate effect of all this is quite perceptible. Then the depressed parts of the thorax are raised by one hand gliding from the anterior aspect of the chest backwards, raising the concave side, whilst the other presses down the projecting parts on the convex side by stroking with pressure from the spinal column forwards around the chest, at the same time pressing downwards the prominent side, and thus literally remodelling the youngster. Prominences elsewhere, as under the scapula, receive special pressure. Sometimes these operations can be done better while the patient stands or bends forwards. Precise rules cannot be given as no case of scoliosis exactly resembles another. A well-schooled anatomical eye, therapeutical instinct, inclination to treat such cases, together with experience, will lead to accurate treatment and good results.

For special exercise of the extensors of the back the patient is



placed and fixed upon the anterior aspect of the legs on a table, the body projecting beyond the edge and sufficiently supported. Then the patient elevates the trunk from the horizontal position backwards to a right angle, if possible, by energetic contraction of the extensors. We think the patient should often be assisted in elevating the trunk.

To wind up the *seance* Landerer allows the patients to suspend themselves five or ten times by means of Sayre's apparatus, the hand corresponding to the higher shoulder should then be the lower. When treatment has been continued for a few weeks active exercise is allowed by means of a basket carried upon the head with a weight of three to five kilos in it, which is supported by the hand of the depressed side.

Whilst the patient is suspended we have found it advantageous to manipulate, roll and percuss the muscles of the back; well known beneficial aids, not spoken of by our author, are rowing, sitting on an inclined plane with the higher shoulder towards the higher end so that the patient must bend in this direction and make a constant effort to keep from sliding off. Placing the arm of the side that corresponds to the convex dorsal curve across the front of the chest in an upward direction so as to relax the serratus magnus and rhomboidci muscles, whilst the arm of the opposite side is placed obliquely downwards across the back so as to make the same muscles on this side tense, forms a useful exercise by literally unscrewing the patient. With the arms in like position, the patient sitting on an inclined plane can pull the elastic bands and get still more effect as recommended by Professor Sayre.

This treatment is usually given once daily, but in difficult cases or where a speedy result is desired, it may be used twice a day.

Our author gives details of the treatment and results in eighteen cases. Seven of these he places little importance upon, as they were mild and would probably have recovered perfectly, if not so soon, under the usual orthopædic exercises. But it was quite otherwise with five of the cases which were much worse. In these treatment was begun without any hope of improvement and only at the request of the patients. In from twelve days to five weeks there was marked improve-

ment, they were soon able to do without their supports, the deviation in the spinal column decreased, the shoulder became more horizontal and pain and tension disappeared. Of the remaining six cases four were improved and two got well. At the time of writing several were under treatment so that the results may be still more favorable. At a time of life when the skeleton was so consolidated as it was in the case of an 18-year-old girl, it was not thought possible to produce any remodelling, but after two months' treatment it was hardly possible to perceive any deformity. Landerer finds an analogy to this last case in several of severe so-called inflammatory flat-foot or *tarsalgia adolescentium* in which he succeed in obtaining "perfect reformation" of the foot by means of massage of the plantar surface and of the leg, even at 20 years of age.

We think that another analogy can be found in the relief that massage affords in cases of rheumatic gout. It relieves the tenseness of the soft tissues and makes them more supple, so that they adapt themselves much easier to the fixed nodosities.

Our author believes in the use of supports and corsets for alleviating and correcting the position of advanced scoliosis; but when there is any prospect of improvement he considers them contra-indicated, for the little work that the muscles of the back may be capable of performing is taken away by supports and atrophy speedily results so that the muscles can no longer be used. After two or three massages he found that most of his patients could do without supports and rejoiced once more in free and lively motion.

In the discussion which followed Herr Volkmann deprecated the wearing of a plastic jacket or felt corset by day and night. He has the corset removed at night, and in the morning the patient is bathed, douched and *masseed*, and practices movements, as advised by Sayre, and about 11 o'clock the corset is again applied.

Herr Loebker stated that he believed in the energetic treatment by means of massage of those muscles which contribute to the support of the spinal column. He does not apply any supports, and improvement takes place from the time that these are laid aside.

Herr König, of Göttingen, said that Landerer's method was in ad-

vance of that hitherto employed by him ; yet he would not renounce altogether the corset treatment in favor of massage. He would limit the use of the corset to school time. Experience had taught him that the complete removal of the corset all at once hindered improvement.

Herr Kölliker, of Wurzburg, remarked that the most essential difference between Landerer's treatment of scoliosis from that hitherto employed consisted in energetic percussion of the muscles. He mentioned a very severe case of scoliosis with three curves which he had treated daily for three months by means of massage and percussion for several minutes night and morning, and thereby obtained a brilliant result never before equalled in his experience. With scoliosis of the second degree the corset should be applied in the intervals between massage.

DOUGLAS GRAHAM.

KOEHL ON THE CAUSES OF THE DIFFICULTIES IN DISPENSING  
WITH THE TUBE IN SOME CASES OF TRACHEOTOMY  
FOR DIPHTHERIA.<sup>1</sup>

The time for the removal of the canula in cases of tracheotomy must differ in hospital and private practice. If we regard a severe diphtheria as having run its course in four or five days, the trachea at the end of this time being passable to air the canula is justly removed. Delay in the removal of the tube is a fertile cause of stenosis (granulom) of the trachea. By the comparison of various statistics it is found that fourteen days is the interval at the end of which in the majority of severe cases the larynx becomes again permeable. Allowing eight days additional for attempts at removal of the tube, we have an extreme limit of three weeks to work upon. If the efforts at the removal of the canula extend beyond this period, we can with justice speak of a difficulty or obstacle to the removal of the canula. The author of the above paper has passed in review various conditions of the larynx which are apt to cause delay in removal of the canula. The first condition considered : Diphtherie a forme prolongée (Cassicourt) has

<sup>1</sup>Ueber die ursachen der Erschwerung des décanulement nach Tracheotomie in Kindesalter wegen Diphtherie. By Emil Köhl. Archiv. f. klin. Chirurgie. Bd. XXXV, Hft. 1.

already been discussed by the French author and Hénocq (Charité Annals). Recurrent attacks of diphtheria with a new onset of fever and formation of pseudo-membrane also will necessitate reintroduction of a tube already removed.

Chorditis inferior is an important condition which may for a time escape recognition. This is a swelling of the mucous membrane and submucous tissue below the true cords and above the cricoid cartilage. In infectious diseases it may set in as an acute condition and give rise to serious symptoms. After diphtheria it rarely necessitates a second tracheotomy and is of a mild form. With the laryngoscope we can easily see it as a pouting of the mucous membrane from beneath the true cords and on the posterior laryngeal wall. In extreme cases the movements of the cords are interfered with or entirely suspended, (Gerhart, Störk, Rauchfuss, etc.). The treatment of this condition is limited to topical applications of silver. It must be carefully differentiated from the condition known as *granulations stenosis*. The author has collated a large number of cases of this condition scattered through the French and German literature. It is not as infrequent as generally supposed. The formation of granulations into a distinct growth delays at times the withdrawal of the canula or necessitates its reintroduction. In some cases, though existing, these granulations give rise to no outward symptoms and are only accidentally discovered. In other instances the tracheal tube being withdrawn there is a gradually increasing dyspnoea which becomes more pronounced when the patient takes the recumbent posture (sleep), diminishing when the patient sits upright. These attacks of dyspnoea may threaten the life of the patient or cause sudden death.

In some cases such dyspnoea ensues immediately on withdrawal of the canula as to necessitate its reintroduction. The canula in cases may be withdrawn and then an attack of coughing setting in the polypus is expelled from the trachea and the dyspnoea definitely disappears. Difficulty may at first be experienced on removal of the canula, and these obstacles may disappear with the spontaneous atrophy of the granulations. The pedicle of some of these polypous

growths may become twisted and thus cause strangulation of the growths. Lastly where the obstruction of the trachea through granulation has caused a necessity for repeated reintroduction of the canula, this manœuvre alone by exerting a certain amount of mechanical pressure has caused atrophy of the growths. No difficulty may be experienced upon or after the removal of the canula, and yet the presence of these granulations cause a sudden and single attack of dyspnœa which may kill the patient.

The polypi resulting from exuberant granulations ("granulom") may be seated on the upper or lower angles of the tracheal incision, or around the whole circuit of the wound. Again the anterior and posterior tracheal wall which comes into contact with the extremity of the canula and finally the part of the posterior wall of the trachea which impinges on the convexity of the canula may all be the seat of granulom. There is no case in the literature which will prove that points other than the above are affected by granulom after tracheotomy. It is still questionable whether a granulation polypus can develop on the base of a necrotic loss of substance, the result of the diphtheria; such a loss of substance can affect any part of the trachea and usually when extensive ends with the death of the patient. The so-called diphtheritic ulcers or loss of substance are generally superficial and heal without stenosis. Stenosis only results at the points above mentioned and never have been observed elsewhere. The rarest point for the formation of granulom are the anterior and posterior tracheal wall opposite the lower end of the canula. But the anterior wall at the point above is the most favorite seat for the development of decubitus ulcers with a consequent cicatricial stenosis, resulting in the formation of a sickle-shaped fold of tissue encroaching on the lumen of the trachea.

The borders of the incision are no doubt the most favorite seat for the development of granulom. Here these growths may at first be broad at the base later on becoming sessile (polypi). The author from a careful study of cases concludes that the larger the incision in the trachea (thereby increasing the triangular void spaces above and below the canula) the more abundant the formation of these granulations. The fenestrated canulæ are also a fertile agent in favoring the production of

granulom. The fenestrated canulæ are only to be employed in those cases where a temporary paresis of the vocal cords from long disease (*gewohnheits parese*) delays *décanulement*. It is easy to understand how abundant granulations may obstruct the trachea. But to reconcile the great danger to life with some small sessile *granulomata* it must be supposed that they are somewhat larger during life than as found *post mortem*. By causing a collection of mucus in the trachea at night and also by irritating the posterior wall of the trachea they cause intense respiratory efforts of the patient. The growths themselves during these attacks of asphyxia become *turgescent*, enlarged and necessitate operative interference. Diagnosis in these cases is by no means so simple. Intra-tracheal inspection with mirrors or the inspection from the mouth, the character of the *dyspnœa* (worse at night). A peculiar flapping sound on auscultating the trachea (*Perier*) are among the aids mentioned. *Chorditis inferior* is to be excluded in all these cases. The therapy of this condition (*granulom*) runs the gamut of operative interference, cauterization by silver, acids, heat, *curetting*, crushing and snaring the growths. These operative measures are followed by a careful avoidance of *décanulement* until the dangers attending the above are past. Fenestrated canulæ are not to be used. The rational prophylaxis in the above cases is first that the incision in the trachea be gauged carefully to fit the canula introduced. The tracheotomy, if possible, should be a superior one. Attempts to remove the canula should be made from the third or fourth day after introduction. When the canula is removed the wound is simply covered with a piece of moist gauze to prevent mucous incrustations, cauterization of exuberant granulations is resorted to and fenestrated canulæ avoided.

Distortions of the tracheal walls, among others a projecting forward of the posterior wall of the trachea may form an obstacle to removal of the canula. This occurs above the convex portion of the canula and where the incision in the trachea is large or the canula of great diameter. The above may be complicated with a backward dislocation of the anterior wall of the trachea or *granulom*. In the child's larynx these complications are of especial serious moment. In large in-



cisions the extremities of the tracheal rings may be dislocated backward into the lumen of the trachea and fixed in this false position causing stenosis. Prophylaxis points chiefly to performing a pure superior tracheotomy and saving the cricoid cartilage intact, for the support of the rest of the trachea.

Relaxation of the anterior wall of the trachea with a funnel shaped drawing inward of the same during inspiration may be caused by widespread necrosis of the anterior wall. The author has given in this brochure a very exhaustive consideration of the various methods of treatment of stenosis of the trachea, especially cicatricial stenosis. Chorditis inferior is included under the above chapter. The treatment finds its principal support in the various methods of dilatation by bougies and canulæ introduced from the wound or mouth. The author closes the above paper by a careful consideration of the paresis and paralysis of the structures of the soft palate and vocal cords as a prominent obstacle to the removal of the canulæ after tracheotomy.

The first attempts at removal of the canula having failed the little patients resist any further attempts at décanulement, this resistance easily causes attacks of dyspnœa, and warns against any removal of canulæ under these circumstances. The above the author has ranked under "moral influences" preventing décanulement.

Under "Spasmus Glottidis" he has discussed the so-called attacks of spasm of the glottis which by French authors are said to follow in some cases after removal of the canula.

He has not met any cases in his own experience though not at all doubting the possibility of its occurrence. In closing we would like to notice a peculiar condition of "paresis from disuse" (Gewohnheitsparese) which is mentioned by the author as giving in certain cases rise to urgent symptoms on removal of the canula. There is here a paresis of the dilators of the glottis which have remained inactive during the disease. Presupposing that all other obstacles to the removal of the canula have been disposed of and excluded (granulom), we find that on removal of the canula the excitement attendant on the operation calls forth intense dyspnœa, or if the canula is removed there may be momentary quiet followed in a short time by dyspnœa necessitating reintroduction of the canula. Here the fenestrated canulæ find their most pertinent application.

HENRY KOPLIK.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

I. The Role Played by the Tissues in Acute Inflammations and the Changes Observed in the Cells of the Connective Tissue. By Dr. KARG. The changes in the fixed connective tissue cells (karyo-kenesis) are closely observed. The endothelial cells of the præpatellar bursa in the human subject were chosen for this purpose. The bursa was extirpated while in active inflammation hardened and studied. Karyo-kenesis was observed in spots where purulent inflammation was not advanced. On the inner surface of the bursa several layers of large cells, spindle or round shaped, with large quantity of cell protoplasm, nuclei pale, large and oval with nucleoli and an intra-nuclear network (epithelioid cells). A few leucocytes were also observed. In the nuclei of the epithelioid cells the chromatin arranged itself into star-shaped figures, the cell membrane had disappeared and the nucleus was surrounded by a transparent zone. In other places distinct divisions into daughter stars was seen (karyo-kenesis). In certain spots where *macroscopically* small yellow accumulations of streptococci indicated an active bacterial invasion, (purulent inflammation) under the microscope no karyo-kenesis was seen. In certain early stages of inflammation therefore, there is a proliferation of the cells of the connective tissue, concomitant with the diapedesis of blood cells with the changes in the wall and lumen of the blood vessels. The epithelioid cells result from the fixed connective tissue cells. The above changes can be observed in the endothelium of blood vessels. Thiersch, Waldeyer, Ranvier attribute the organization of thrombi to their epithelioid cells. In one form of inflammation (reparative, non-specific) the inciting agent, or trauma or chemical influence, ceases to act after the first moment. Here a scanty migration of leucocytes results and the karyo-

kenetic changes in the connective tissue cells mark the proliferation of the same and the consequent repair results. In the other form of inflammation (infectious specific) the bacterial element acts as a constant irritant, processes leading to an abundant migration of leucocytes prevail, karyokenetic changes cease and destructive processes are inaugurated.—*Deutsche Zeit. f. Chirg.*, Bd. xxv, hft. iv and v.

## II. Micro-Organisms in the Air of Hospital Wards.

By Dr. VON EISELBERG (Billroth's Clinic). Investigations directed to the detection of the streptococcus playing the etiological role in cases of erysipelas (streptococcus, erysipel., Rosenbach). The first efforts were directed to the air of the general wards and discovered in cultures prepared from exposed gelatine and agar plates, in addition to many unimportant mould fungi, the staphylococcus pyog. aureus (Rosenbach).

A second series of experiments were made in a surgical ward where there had been four cases of erysipelas.

Plates prepared in the manner below described had given cultures of a streptococcus identical in appearance and behavior to that described by Fehleisen (streptococcus erysipelatosus).

A third series of exposures of gelatine plates were made in an isolation ward where there were patients suffering from erysipelas. Here the plates were exposed in immediate vicinity of the patient on the bedding. The author in these cases also thinks he has discovered the streptococcus erysipelatosus. Lastly cultures were made of desquamating epidermal scales of erysipelatos regions of the body and the above streptococcus found. In healthy individuals epidermal scales did not give the same results. The methods employed by the author were of the most simple and primitive nature (from a bacterial standpoint). Plates of sterilized gelatine were simply exposed to the air of the above localities for a certain length of time then put under bell jars and allowed to remain a certain time until development of colonies. The painstaking methods of Hesse or the method of Emmerich (bouillon) were not tried. Dr. Eiselberg then made cultures from the above plates in gelatine and agar tubes, and in a series of experiments he inoculated rabbits in order to observe the effects of the culture obtained.

The author makes the positive conclusion as to the presence of streptococcus erysipel. in the air of wards, and as a result advises not only the isolation of patients affected with erysipelatous and phlegmonous complications, but separate pavilions and corps of nurses — *Arch. f. klin. Chirg.*, Bd, xxxv, hft. I.

HENRY KOPLIK (New York).

## OPERATIVE SURGERY.

**I. A New Plastic Method for the Cheek.** By Dr. J. ISRAEL (Berlin). In defects of the cheek, it is necessary to replace both skin and mucous membrane. Thiersch's method, by first letting the flap granulate, is limited because of shrinkage to small defects. To make double flaps from the remaining skin of the face leaves terrible scars. Israel takes a single long flap from more distant hairless regions. He presented a case where he had thus replaced the whole buccal mucous membranes and a large part of the skin, after extirpation of a cancer. The flap was taken from the lateral neck and supraclavicular region as far as the clavicle. The pedicle began at the border of the beard below the angle of the jaw. The flap was reversed and placed in the defect, its epidermal surface thus facing the oral cavity. At the end of seventeen days bridge pedicle was divided low enough to give a flap which, after freeing from granulations, would just replace the skin of the cheek. The third act consisted in adapting it to the corner of the mouth. A fourth act consisted in freshening and uniting the posterior flap-border to the posterior defect-border.

In the discussion Hahn stated that he had proceeded similarly (flap from the breast however) in four cases.—*Proceed. XVI Germ. Surg. Congress in Centbl. f. Chirg.*, 1887, No. 25.

**II. A New Method of Rhinoplasty for Saddle Nose.** By Dr. J. ISRAEL (Berlin). König's method for this purpose [*v. ANNALS*, 1887, Jan., pp. 59-60] has disadvantages. It disfigures the forehead by the removal of two flaps, and leaves an unæsthetical lump instead of the normal depression between forehead and nose. I. takes but one 7 mm. wide quadrangular skin-periosteum-bone flap from the forehead. This he turns down with its bony surface out, to form the

bridge of the nose. The soft part of the nose is severed from the bone transversely and drawn forwards; to this the free end of the above flap is sewed. The frontal wound is stitched up. The bone surface of the flap is allowed to granulate and cicatrize; this draws the skin from the posterior surface around until it covers two-thirds of the flap's circumference. The sides of the nose are now formed from the old depressed bridge. This is divided down the middle—the superimposed flap being held aside—and prepared back after cutting across above and below. This gives a quadrangular flap on each side. The skin of the piece from the forehead is freed along its edges so that raw surface comes against that of the external flap and its skin-surface is left facing inwards. In this way a narrow margin of skin that has been drawn to the front surface of this flap is left there, and with the two flaps from the original bridge of the nose constitute the covering of the new bridge.

He demonstrated two originally bad cases where, for the present at least, very nice results were achieved.—Proceeds. XVI Germ. Surg. Congress in *Centbl. f. Chirg.*, 1887, No. 25.

**III. A Method of Removing any Desired Amount from a Goitre without Tamponade or Loss of Blood.** By Dr. E. HAHN (Berlin). Owing to the frequent bad effects of total extirpation for goitre the preference is now for partial extirpation so executed as to avoid much loss of blood, spare the recurrent nerve and give favorable conditions for the wound to heal.

In a recent case H. tied the superior thyroids and the ima. After preparing the gland free, he placed artery forceps on the inferiors.

Next he divided the capsula propria down into the gland on the left. With knife, scissors and pincers he then cut away large pieces of the gland without injuring the capsule at any other point (intracapsular extirpation). On the right he proceeded in like manner. Thus the operation on the gland itself was bloodless. Vessels that bleed on cutting the capsule are, of course, tied. The forceps to the inferior arteries are for immediate removal in case speech trouble indicates that the recurrens is included. For this the best forceps have just enough spring to compress the artery, but not to crush the nerve; they

are removed in 24 hours. Secondary suture in a few days. The wound had almost healed in 10 days. The absence of hemorrhage allows better control of the operation. Twisting and crushing is avoided. Danger of sepsis is less, etc.—Rept. XVI Germ. Surg. Cong. in *Centbl. f. Chirg.*, 1887, No. 25.

WM. BROWNING (Brooklyn).

## NERVOUS SYSTEM.

**I. Gangrene of Portion of Median Nerve Without Loss of Function in Supplied Parts.** By Dr. FERRET. A boy of 14 had his forearm crushed by a thrashing machine, the brachial artery being torn through and the median nerve stretched to such an extent that it afterwards sloughed.

The wound healed in four weeks and sensation, motion and electrical reaction, were found unimpaired in the muscles supplied by the median.

The author concludes that the nerves communicated (as is sometimes the case) below the seat of injury.—*Le Progrès Médical*, May 7, 1887.

## HEAD AND NECK.

**I. Traumatic Intraocular Hæmorrhage. Posterior Ophthalmotomy. Recovery.** By M. ROLLAND. Complete loss of vision in a child of 12 from the blow of a cracker. Treatment unavailing for two months, after which the author cut down on the globe between the superior and external recti at a point 5 mm. from the ciliary circle. A Graefe's knife was thrust into the vitreous, and blood came out.

Next day the patient could count fingers and would read after fifteen days. The field of vision was somewhat contracted at the lower part, but there was no scotoma.

The operation has been done before for pathological hæmorrhage in cases of hæmophilia, but never before for traumatic hæmorrhage. The author strongly recommends the operation in such cases.—*Le Prog. Méd.*, Jan. 1, 1887.



II. A Case of Subluxation of the Axis with Recovery. By M. ANNEQUIN. A horse soldier was thrown with his head forcibly flexed on his chest. Symptoms of injury were so slight that it was more than a month before the injury was suspected; the man having returned to duty, but being invalid on account of mumps, a stiffness of the neck led to the discovery of a bony projection into the pharynx with a corresponding depression below the occiput. There was no apparent hæmorrhage.—*Le Bull. Méd.*, June 19, 1887.

A. F. STREET (Westgate).

III. Treatment of Adenoid Vegetations of the Naso-Pharynx. By Dr. R. CALMETTES (Paris). The writer strongly advocates the complete removal under an anæsthetic of these growths at one sitting. He uses the large curved cutting forceps, but has aided their employment by a manœuvre designed to draw forwards the soft palate and thus expose more readily the field of operation. An india-rubber tube is passed through the least obstructed nostril and its distal end made to protrude into the pharynx. This is then grasped by forceps and drawn through the mouth. By traction on the loop it is now obvious that the soft palate and uvula can be pressed forwards against the hard palate. The index finger is used for exploring the site of the tumors and facilitating their removal, and at the end of the operation it is forcibly introduced into both the posterior nares to make sure that they are clear. The use of ice and boracic acid powder insufflations for the nose form the after-treatment.—*Gaz. Méd. de Paris*, June 4, 1887.

J. HUTCHINSON (London).

IV. Lateral Pharyngotomy for Removal of Tonsillar Tumors. By Prof. OBALINSKI (Cracow). In view of the chaotic state of these operations O. with a case illustrates a modified form of Mikulicz's operation, or rather of his first method as he claims to have also operated with a like modification.

One external incision runs along the front border of the sterno-cleido from mastoid process to annular cartilage; the other is from the angle of the jaw, perpendicular to the first. The lower jaw is sawed

through 1 cm. above the angle (between temporal and masseter muscles), but the joint piece is not removed. The two segments are drawn apart by hooks, and after removal of the tumor, brought back and doubly wired together.

Before closing the wound a tube was inserted reaching to the stomach. This could be removed in 10 days. Patient was discharged recovered, in 5 weeks, and with a normally acting jaw. This method he recommends in high pharyngeal resection; Gussenbauer's incision simply is sufficient in low; whilst for cases where the tumor involves the floor of the mouth Langenbeck's or Kocher's cut is most suitable. —*Centbl. f. Chirg.*, 1887, No. 28.

## CHEST AND ABDOMEN.

**I. On the Operative Treatment of Pyloric Stenosis.** By Prof. MIKULICZ (Königsberg). Heinecke, two years since, cured a case of cicatricial stenosis of the pylorus, by slitting the constricted spot longitudinally and uniting the wound in transverse direction. Without knowing of this case M. did the same operation on a woman, æt. 20 years, with excessive stricture. The momentary functional success was brilliant, but death resulted in three days from increasing collapse. Below the pylorus was a 2 cm. deep ulcer reaching into the substance of the pancreas. The previous hæmorrhages after each taking of food had nearly exhausted the patient. The ulcer was seared with the thermo-cautery, stopping further hæmorrhage. In this case neither resection nor gastro-enterostomy would have answered —*Proceed. XVI Germ. Surg. Congress in Centbl. f. Chirg.*, 1887, No. 25.

**II. To Find the Beginning of the Jejunum.** By Dr. E. HAHN (Berlin). In demonstrating an operated case of gastro-enterostomy H. stated that from numerous trials on the cadaver he had found this was very easy to accomplish. After incision of the abdominal wall the omentum and colon are pushed up, when the index finger and thumb of the right hand determine the part of the pancreas lying on the vertebral column, and seize the loop (of intestine) which crosses

from right to left just below the pancreas. If on pulling at this it does not follow, then it may be positively assumed that one has the first part of the jejunum.—Rept. of XVI German. Surg. Congress in *Centbl. f. Chirg.*, 1887, No. 25.

**III. Palliative Incision for Peritoneal Tuberculosis.** By Dr. REUSS (Berlin). Woman, æt. 36 years. For two years loss of appetite and flesh; for over one year enlarging abdomen, with pain and frequent diarrhoea. Sent to him as a cystovarium. Exploratory incision. Encapsulated peritoneal tuberculosis with clear fluid. Scattered nodules over intestines and peritoneum, also adhesions. Fluid removed. Patient discharged in sixteen days. For six months she increased in weight and enjoyed good health, but died at the end of one year from subacute intestinal tuberculosis. No recurrence of the ascites.—*Wien. Med. Woch.*, 1887, No 34.

**IV. On Laparotomy in Tuberculosis of the Peritoneum.** By Dr. KUEMMELL (Hamburg). In the *ANNALS* for July, 1887, (pp. 71 and 72) some particulars of this method were given. K. counts up some thirty patients operated in this way, including two of his own. The first case, that of Spencer Wells, (1862) is still living. K.'s first case was that of a woman, æt. 17 years. Correct diagnosis not made. The walls of an encapsulated ascites were thickly covered with miliary tubercles. A double-fist-sized pocket of glands lay beside the spine. She recovered, left off morphine and gained 20 pounds in eight to ten weeks. The retroperitoneal glands became smaller, but menstruation did not return and both ovaries are involved in cicatricial tissue.

His second case was in a man—the only one in a male, so far reported—who, after being operatively cured of a pelvic caries, was attacked in a few weeks by ileus. The band causing the intestinal occlusion was freed by laparotomy. The peritoneum was found to be studded with tubercles. The patient was freed from all symptoms and increased 17 pounds in weight, but died a few months later from general tuberculosis.

Of the thirty cases only two died from the operation (sepsis). Three died from general tuberculosis in twelve, eight and five months respectively. In two cases local trouble did not occur, though a coex-

isting pulmonary affection went on. At the time of reporting there were twenty-five relative cures—of from some months to ten resp. twenty-five years duration.

The external signs of peritoneal tuberculosis were usually those of an encapsulated ascites simulating a cyst. In but a few cases was this part of a general tuberculosis, and in none was the latter hastened by the operation but always improved. The way in which the favorable effect results is not clear. It cannot be the antiseptic as such was not used in all cases. In one case (where iodoform was dusted on at the operation) no trace of the previously existing tubercles could be found at the autopsy eight months later. Cases have been observed where the walls of an encapsulated ascites presented small vascular excrescences, and again where the peritoneum showed nodules like tubercles, without in either case being actually tubercular.

Esmarch added three genuine cases all cured; Mikulicz two, one cured, the other fatal in three months; and Wagner one, a cure of two and a half years duration at date. Wagner did not even wash out the peritoneal cavity.—Proceed. of XVI Germ. Surg. Congress in *Centbl. f. Chirg.*, 1887, No. 25.

WM. BROWNING (Brooklyn).

**V Noteworthy Points in Laparotomy for Visceral Injuries.** By T. A. McGRAW, M.D., (Detroit). 1. There are many viscera in the abdomen which are practically immovable—so immovable as to forbid operations upon them through the median line. When a gun-shot wound is so located and so directed as to make the injury of an immovable viscus probable, the external incision should be made with reference to that fact.

2. The course of a gun-shot wound is determined not by chance, but by the operation of immutable laws.

3. When a gun shot is deflected from its course, it is always at an acute angle, and, when deflected by a very soft substance of little resistant power, the angle of deflection must be exceedingly small. When, therefore, a gun shot passes into the abdominal cavity, the deflection of the ball from the time it leaves the aperture of entrance until it strikes the opposite wall, cannot be sufficient to appreciably alter its course.

4. The initial direction of the ball through the abdominal wall indicates very nearly its subsequent direction through the abdominal cavity. The careful study of the wound of entrance is, therefore, of the greatest importance, and no surgeon should open the abdomen for the repair of visceral wounds without first exploring the wound of entrance sufficiently to make sure of its course through the parietes.

5. The ball, after passing through the abdominal cavity, may be deflected by the bones or soft tissues; but as it, in the vast majority of cases, pursues the remainder of its course outside of the abdominal cavity, these deflections should have no influence in determining the line of incision.

6 Gun-shot wounds of tortuous course frequently owe their apparent deviations from a straight line to a change in the shape of the abdominal wall subsequent to the shooting.

7. In general, the course of the bullet through the abdominal wall, prolonged by a line drawn on the external abdominal surface, will indicate the course of the bullet through the cavity if its velocity is great. If at angles of five or of not more than ten degrees with this line, two other lines are drawn on either side of it, beginning at the wound of entrance, we will have represented on the abdominal surface the greatest deflections of which a bullet is capable during its passage through the abdominal cavity. An incision, therefore, along the whole length of the first straight line could not fail to uncover every part of the course of the ball, provided that there has been no subsequent displacement of the injured tissues.

8 For this reason an incision, beginning at the wound of entrance and prolonged to a sufficient distance in its course, is often the very best which the surgeon can make. This is especially true of such wounds as, beginning at a distance from the *linea alba*, pass in a direct line away from that line.

9. The immovable viscera can be best exposed by incisions made parallel to their long diameters.

10. When abdominal section is made for abdominal wounds, every organ and part of an organ which could possibly have lain in the path of the ball or weapon should be thoroughly explored by the surgeon,

but to examine an exposed viscus or portions of viscera which could not possibly have been injured would be an error in practice.

11. The prognosis of wounds of the empty stomach is not necessarily bad.

12. Large accumulations of fat in the abdominal wall and cavity may sometimes contraindicate laparotomy for visceral wounds.—*Chicago Med. Journ. and Exam.*, July, 1887.

VI. Case of Recovery from Penetrating Gun-Shot Wound of the Abdomen, with Wound of Intestine, After Laparotomy and Suture of the Intestine. By T. A. McGRAW, M.D., (Detroit). Maggie McMahon, æt. 24 years, was shot in the abdomen at 3 o'clock on Tuesday morning, December 21, 1886. She was carried to St. Mary's Hospital at half past 8 o'clock, and I saw her at 9 o'clock on the same morning. I found her vomiting bile, and complaining of great pain. Her pulse was 120 per minute, her respiration 30 and her temperature 120°F. The bowels were moderately bloated and very tender, and two inches above and two inches inside of the right anterior superior spine of the ilium there was a gunshot wound with black edges. There was no tympanitic resonance over the liver, no extravasation of fecal matter, no enphysema, and no general meteorism. The pain was located in the hypogastric right iliac and right lumbar regions. The wound was supposed to have been made by a ball from a revolver of 32 calibre, although that point was never fairly settled. At 12 o'clock, noon, I cut through the abdominal wall at the site of the wound, by making an incision of four inches long in the direction of the fibres of the external oblique muscle, the wound being in the centre of the incision. It was easy to trace the wound into the abdominal cavity by the discoloration of tissues, and it soon became evident that the ball had passed from before backwards, and from above downwards, into the peritoneal sac. My finger, on entering the cavity, immediately detected a hole on the anterior surface of the ascending colon, which I thereupon drew out on to the abdomen. This wound, from which the fecal matter was constantly pouring, was an oval with its long axis transverse to that of the intestine. It was about half an inch long and a quarter of an inch wide. I sewed it up with a continuous suture of catgut, in a double



row, after Czerny's modification of Lembert's method. Searching then for the wound of exit, I found it also vomiting fæces directly behind at the junction of the meso-colon with the intestine. The meso-colon and meso-cæcum in this case were long as the peritoneum completely surrounded the gut. The ilium was united to the intestine on its inner and posterior surface midway between the two wounds. The second wound had its long axis also transverse to that of the bowel, and was sewed together in the same way as the first. This done, I was able to trace the track of the bullet down into the femoral canal before the external iliac and femoral artery, by a ragged opening in the muscle, but its course afterwards is a matter of great uncertainty. I carefully examined the small intestines without withdrawing them from the cavity, but found no other wound. The abdominal cavity was washed out and closed with wire sutures, and a drainage tube inserted. The patient began immediately to improve, and her temperature fell a degree on the same day; she vomited less frequently, and the ejecta contained only mucus and swallowed fluid. Her pulse fell to 100, but her temperature rose again on the second and third days to 102° F. After the third day the improvement was more marked, and on the sixth day she ceased altogether to vomit, and her temperature fell to 99° and 100°. The drainage tube was then withdrawn, without having discharged one drop of pus. Subsequently, however, a small superficial abscess formed in the track of the wound, and on the tenth day discharged a teaspoonful of pus. Her convalescence was thenceforth uninterrupted, and she left the hospital, February 2, suffering only from a lameness consequent upon the passage of the ball into the thigh.—*Chicago Med. Journ. and Exam.*, July, 1887.

VII. Laparotomy in Perityphlitic Abscess with Especial Reference to Perforation of the Appendix Vermiformis. By ROBERT F. WEIR, M.D., (New York). This paper is a plea for earlier operation and bolder treatment in this class of cases, and contains a critical review of the literature of the subject and an analysis of the ten reported cases of operation for infectious peritonitis for perforation of the appendix vermiformis, which may be tabulated as follows:

No.	Date.	Operator.	Sex and Age.	Indications for operation.	Operative Details and Complications.	Result.	Reference.
1	1883	Mikulicz.	M., 42	General peritonitis and supposed intestinal obstruction.	Laparotomy 5th day; perforation not recognized at operation.	Death 5 days later; perforation of appendix found at autopsy.	Sam m., klin. Vor., No. 262, 1885,
2	1883	Chaput.	M., —	Supposed obstruction.	Laparotomy 10th day; general suppurative peritonitis; drainage; no perforation of appendix recognized.	Death shortly after end of operation; perforation of appendix found at autopsy	Progres Med., ale, 1883, p. 103.
3	1884	Krönlein.	M., 17	All usual signs of peritonitis; temp. not high and not much tympanites.	Laparotomy 2d day. Appendix found perforated and removed for first time in history of surgery.	Death two days later after a temporary amelioration of symptoms.	Arch. für klin. Chir., Bd. 33, s. 507.
4	1885	Krönlein.	M., 17	Early symptoms pointed to right iliac disease and stercoraceous vomiting developed and induced operation.	Laparotomy 8th day; perforation not found. Belly cleansed and closed without drainage.	Recovery.	Loc. cit.
5	1884	Polaillon.	M., 19	Supposed obstruction of bowels with fully developed peritonitis.	Laparotomy 7th day; perforation not found, source of obstruction not recognized. Loop of gut sewed in abdominal wound making an artificial anus.	Death 10 hrs. after; perforation of appendix found only at autopsy.	L' Union Med., cale, 1884, p. 4.
6	1885	Poncet.	M., Adult	General peritonitis and faecal vomiting.	Laparotomy 4th day without anaesthesia; perforation not found, only a probably secondary ulceration of mesentery recognized; drainage.	Death same day; autopsy showed appendix not perforated but gangrenous and containing several faecal concretions.	Truc: Traitement chir. de la peritonite, 1886, p. 57.
7	1886	Regnier.	M., 16	Symptoms of intestinal obstruction with stercoraceous vomiting.	Laparotomy 5th day; suppurative peritonitis found.	Death 7 hrs. later; perforation of appendix only at autopsy.	Truc: loc. cit.

No.	Date.	Operator.	Sex and Age.	Indications for operation.	Operative Details and Complications.	Result.	Reference.
8	1886	J. L. Ho- manns,	M., 11	Pain and tenderness in right iliac region 5 days; dullness on percussion and high and increasing temp. and pulse.	Laparotomy 5th day over most tender spot exposing healthy intestines; by poking with fingers an abscess containing 2 oz was opened and drained.	Recovery.	Annals of Surgery, Vol. IV, p 242.
9	1886	R. J. Hall.	M., 17	Acute peritonitis with right inguinal hernia; strangulated hernia diagnosed.	Laparotomy 4th day. Hernial sac opened, giving exit to pus; at top of sac, cæcum recognized and a perforated tubercular appendix, which was ligatured and removed. Wound enlarged upward 3 inches and peritoneal cavity opened enough to admit the hand by which a number of purulent deposits were broken up and emptied; no washing out; large drainage tube and vent of iodoform gauze.	Recovery.	N.Y. Med. Jour., June 12, 1886.
10	1886	J. D. Bryant.	M., 19	General peritonitis with referred epigastric pain.	Laparotomy end of second day, discovering appendix perforated in three places; peritoneal toilet and washing out with a 1000 sublimate solution.	Death 12 hrs. later.	Gaillard's Med. Jour., Feb., 1887.
11	1886	R. F. Weir.	M., 22	Pain in abdomen especially in right iliac region, where there was a slight but not marked dullness while the rest was tympanitic; aspiration drew sero-purulent fluid.	Laparotomy 5th day first in the right iliac fossa hoping for a circumscribed collection but it proving to be a general circumscribed peritonitis, median laparotomy was done and a perforated appendix easily recognized; this was tied off, the stump ligatured and sewed in, and the belly washed out and drained.	Death 6 hrs. later	Annals of Surgery, vol. vi, p. 78.

No. Date.	Operator.	Sex and Age.	Indications for operation.	Operative Details and Complications.	Result.	Reference
12 1887	R. F. Weir.	M, 19	Progressive pain in right iliac fossa; no tumor nor percussion-dullness; no pus on exploration with aspirator needle; faecaloid vomiting on the 4th and 5th day, with tympanities	Laparotomy 5th day through incision 3 inches long, subsequently enlarged after an abscess had been detected at brim of pelvis, which broke under touch of finger, allowing 5 oz. or 6 oz. of foetid yellow pus to run over the already inflamed intestine in pelvic cavity and adjacent parts; pelvic cavity washed with quite hot water; appendix exposed and found to be perforated in two places and to contain faecal concretion; ligatured and excised; abscess extended from pelvic brim across top of bladder and between it and rectum; drainage.	Death 4 hrs. later, not rallying from the shock of the operation.	Present paper.

The views presented in this paper are practically the same as reported in the *ANNALS OF SURGERY*, Vol. VI, P. 78. He proposes that hereafter, anæsthesia should either be done away with or limited as much as possible or replaced by cocaine, and recapitulates in the following propositions: (1) That the generality of perityphlitic abscesses are due to inflammation or perforation of the appendix vermiformis. (2) That the mortality in such lesions is greatest prior to the third day. (3) That as soon as it can be recognized, pus should be evacuated extra-peritoneally if possible, or by lateral laparotomy, and the cavities drained. (4) That if aspiration fails to detect pus where a tumor exists, it is wiser to make an early extra-peritoneal exploratory incision. (5) That where general peritonitis is progressing, with any history of a right iliac pain, a limited lateral (preferably) or a median laparotomy should be made, to explore the region of the appendix within forty-eight hours from the inception of the disease. (6) That if pus is thus recognized, it should be evacuated and a drainage tube inserted without toilet of the peritoneum.—*N. Y. Med. Rec.*, June 11, 1887.

**VIII. Laparotomy for Removal of a Fork Swallowed Fifteen Years Previously.** By Drs. ROSATI and CATANI (Florence, Italy). Dr. Walter J. Freeman reports the following remarkable case occurring in the hospital of St. Giovanni di Dio, of Florence, Egisto Cipriani, an Italian juggler, æt. 38, in 1872, accidentally swallowed a fork with which he was performing. Various attempts to extract it *per vias naturales* proving unavailing, he resorted to the occupation of type-setting until fifteen years later, when an attack of pleurisy was accompanied by obstinate but not stercoraceous vomiting, which continued after the cure of the pleural complaint. A tumor was found in the median line of the abdomen below the umbilicus, and as the fork had not been known to pass per anum, it was decided to perform laparotomy to examine the tumor and search for the foreign body. Accordingly, under full antiseptic precautions, an incision was first made in the gauze over the spot chosen for operating, the rest of the abdomen being covered with the gauze, which was renewed several times during the operation. The operator then made an incision in the median line four inches in length downward from a point an inch and a half below the umbilicus. A tenaculum was used in every instance to pick up the fascia before inserting the grooved director. Nearly an hour was expended in opening the cavity by reason of the strong adhesions due between the tumor and the parietes. A few bubbles of inodorous gas was the first sign that a cavity had been opened; the opening was enlarged sufficiently to admit an exploring finger, when the fork was immediately felt. With a pair of strong forceps the fork was drawn to the opening, where but a few strokes of the knife were necessary to free it, without having to enlarge the opening into the sac more than an inch. It was then found that the fork had passed through the whole length of the small intestine, and had lodged in the cæcum, where it had set up inflammation and had nearly ulcerated its way through the bowel. It was almost encysted, and by its weight had swung the cæcum around to the median line, where it adhered. No fecal matter nor pus was present, and during the operation the peritoneal cavity was not opened. Without meddling further with the tumor, its opening was closed with catgut sutures, the wound in the

abdominal wall thoroughly cleansed and the edges brought together by five deep stitches. A short (2 inch) drainage tube was laid between the two surfaces of the wound, which was then closed by a continuous suture and iodoform dressing applied. Aside from a chill with some slight elevation of temperature, attributed to catheterization, immediately following the operation, the patient made a rapid and complete recovery. The fork, a solid one, was eight inches in length and the base of the tines, of which there were four, were encrusted with calcareous and fæcal matter only one-third the distance up, leaving the points uncovered and very sharp [from corrosion.—*Polyclinic*, June, 1887.

**IX. Laparotomy with Resection and Suture of the Intestine for Gangrenous Strangulated Hernia.** By JOHN A. WYETH, M.D. (New York). In a case of strangulated femoral hernia with gangrene of the gut in a woman, æt. 56, the strangulation having existed about ten days, two and a half inches of the small intestine with a triangular bit of the adjoining mesentery were removed by abdominal section along the outer side of the rectus muscle of the side affected, and the two ends of the gut sutured. The femoral canal was closed and a radical cure of the hernia secured. The writer specially emphasizes his method of joining the ends of the divided gut, a combination of Czerny's sutures through the mucous membrane alone, Lembert's suture and an intermediate suture, piercing the peritoneal coat, passing along with the muscular layer, and coming out on the free border of the gut. The Lembert and intermediate sutures alternate throughout the entire circumference and should be one-eighth inch apart; the Czerny sutures should be from one-fourth to three-eighths inch apart. The patient rallied well from the operation and ultimately made a good recovery. The author divides the treatment of strangulated hernia with gangrene of the intestine into three methods: (1) Establishing a permanent fæcal fistula at the seat of the hernia. (2) Immediate excision of the gangrenous portion of the gut through the hernial opening, reunion of the ends by suture and return of the loop. (2) Temporary fistula followed, after an interval of some days, by laparotomy,



excision and suture. The first is adapted to subjects so feeble that no operative procedure is justifiable; the second to well-nourished patients who bear the anæsthetic well; the third to intermediate cases.—*N. Y. Med. Jour.*, Mar 19, 1887.

JAMES E. PILCHER (U. S. Army).

**X. Case of Herniotomy With Excision of Gangrenous Portion of Intestine. Recovery.** RUSHTON PARKER, F. R. C. S. (Liverpool). In this case, which makes the third, in which the author during the last four years has performed excision of gut in herniotomy, the result was successful. The patient was admitted with strangulated inguino-scrotal hernia on the left side, of about 24 hours' duration. On opening the sac, excessively foetid, blood-stained liquid escaped, revealing a coil of greenish-black small intestine, and a mass of omentum. The neck of the sac was the external abdominal ring tightly embracing the contents. On freely laying open the sac through the stricture, the peritoneal aperture was plugged with a sponge soaked in perchloride of mercury solution, while the unsound contents were being excised. The narrow omental pedicle was tied with catgut in two portions, cut beyond, and the stump returned, while the whole of the intestinal coil, steeped in and dripping with putrid liquid, was cut away with a corresponding wedge of mesentery, hæmorrhage being prevented or arrested by clamping with the fingers and by sponge pressure until the bleeding vessels were tied with catgut. The mesenteric gap was closed by continuous catgut suture, and the intestinal tube reunited by means of interrupted stitches of the same material.

These latter penetrated no deeper than the muscular layers, and were passed twice through the tissues of each piece of gut, so as to bring peritoneum close up to peritoneum, leaving the cut ends of the tube inverted into the canal. After the reduction of the loop of united gut the question of radical cure suggested itself, but here, owing to the laxity of the margins of the inguinal outlet, something more appeared to be necessary than the mere dealing with the sac. Consequently, examination of the testicle having shown it to be atrophied, it together with the tunica vaginalis and all the scrotal part of the hernial sac, injured by putrid imbibition as the latter was—were stripped up to the level of

the inguinal canal, and the cord tied with separate ligatures on each artery, and one round the whole. The abdominal aperture was then closely sewed with catgut sutures as far down as the edge of the pubic bone. A drainage tube, stitches and Listerian dressings were then applied to the superficial part of the wound.

The patient passed the first week in a precarious state ; but subsequently to this improvement set in and on the 20th day meat was allowed and he began to sit up for a short time daily. The deep parts of the wound within the sutures of the inguinal canal healed up by first intention, while the subcutaneous and cutaneous part gaped, and healed by granulation. Thirty-seven days after the operation the patient left for a convalescent hospital having a small sinus which has since gradually closed.—*Brit. Med. Jour.*, Jan. 22, 1887.

**XI. Case of Fæcal Impaction With Complete Obstruction ; Relieved by Introduction of Hand After Full Division of Anus.** By PRICE MORRIS, L. R. C. P. The author gives the notes of the case of a young lady aged 24, who first came under his care some years ago complaining of symptoms of indigestion, occasional vomiting, and who on examination was found to have large, nodulated, firm, painless, movable tumors occupying the lower part, and chiefly left side of the abdominal cavity—and whose rectum was so distended from fecal accumulation that a child at full period could easily have passed through it. By diligent use of soaped warm water, and manual exercise, the mass was broken up and removed. For ten months the patient remained well and at the end of that time she again came under the author's care suffering from the same symptoms. The treatment which was of so much service upon the former occasion failed to relieve altogether the obstruction. A mass was left in the sigmoid flexure of the colon which would not descend into the pelvis. Injections were of no avail, owing to the compactness of the mass. Treatment in this direction failing, symptoms of complete obstruction supervened, vomiting followed every meal, and no fecal discharge took place.

The patient subsequently became very emaciated, and death from starvation appeared to be within a measurable distance of time. The

author determined to try the effect of introducing his hand up the rectum. Under chloroform, in order to effect this object he attempted to dilate the anus, but finding this procedure impracticable he divided the whole structures back to the coccyx. The hand then easily passed—a long tube was inserted and warm soaped water was injected; the big mass at the top of the pelvis, was readily grasped with the hand and crushed, and after the arm was withdrawn, the whole of it was expelled. Eventually, the colon was thoroughly explored and cleared of feces. Sutures were then carefully inserted, a soft elastic catheter placed in the bladder, and opium administered. The bowels gradually resumed their normal functions without the use of aperients or enemas, and the patient has remained in this favorable condition for seven years.—*Brit. Med. Jour.*, Dec. 10, 1886.

H. PERCY DUNN (London).

**XII. Observations Upon the Operation of Gastrotomy.** By Mr. GOLDING BIRD (London). This surgeon having operated upon a patient suffering from epithelioma of the œsophagus, and already extremely weak, with death six hours after, records the following observations:—

The points of interest in the operation were :

1. That after a longitudinal incision below the ribs in the left linea semi-lunaris, the stomach being contracted and with difficulty drawn down, the part of the stomach sewn into the wound was afterwards seen to be only 2 or 3 inches from the pylorus. This showed what Wilkes and Golding Bird had formerly noticed, *i. e.*, that “the semi-lunar line on the left side appears to be too far to the right in order to open the greater curvature of the stomach, unless at the time of exposing it and drawing it down to the wound in the parietes, it is also drawn over to the right so as to bring the left extremity more into view.”

2. That while the stomach wall was held in the wound with blunt forceps it was rapidly and—as the post-mortem examination showed—securely fixed to the incision in the *fascial* structures of the abdominal wall by *continuous* silk suture. The skin was not included, partly to save more time in operating, partly with the hope

of forming a fistulous opening through skin and subcutaneous tissue which would be more easily controlled by a pad and be less likely than usual to permit of regurgitation of food and gastric juice.

3. That at the time of the operation a small meal of brandy and Valentine's meat juice was passed into the stomach through the wound by means of a hypodermic needle. Although the relief to the patient's symptoms thus afforded was only temporary, the method admits of the immediate introduction of food into the stomach without the risk of contaminating the peritoneum, and may be useful in other cases. At the post-mortem examination an epitheliomatous stricture of the œsophagus was found extending upward for five inches from the cardiac orifice of the stomach. The continuous suture had secured perfect adaptation between the stomach and the anterior abdominal wall. As the other organs were fairly normal, death had resulted from starvation.—*Brit. Med. Jour.*, May, 21, 1887.

## REVIEWS OF BOOKS.

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ABDOMINAL SURGERY. By J. GREIG SMITH, M. A., F. R. C. S., Surgeon to the Bristol Royal Infirmary, Late Examiner in Surgery, University of Aberdeen, etc. London: J. & A. Churchill; Bristol: J. W. Arrowsmith, 1887. Pp. 614. (Illustrated).

"The time seems to have come when it is proper to gather together and describe in systematic manner the surgical operations usually spoken of as abdominal." This is the first sentence in Mr. Greig Smith's preface, and if the reader has any doubts about the matter on commencing the volume, he will lose them before he has finished reading it. We have here a very important work, well worthy of a detailed notice, and so well planned and written as to make the task of reviewing smooth and pleasant.

Herniotomy, etc., and epicystotomy are about the only abdominal operations excluded from the work; and, considering the amount of space the former would have occupied and how fully and systematically both are treated elsewhere, their exclusion is fully justified.

In each section the naked eye anatomy and pathology of the parts operated on are dealt with, then the symptoms of the diseases so far as they bear on diagnosis, and lastly the operations and their after-treatment. With each operation is given a short and graphic history of its origin and advance, usually written with great fairness and accuracy. At the end of the book is a bibliography, not complete, but large enough to be very useful.

The work is divided into twelve "sections," namely: (1) diagnosis of abdominal tumours. (2). Abdominal operations considered generally. (3). This and the remaining nine deal with operations on, respectively, the ovaries, Fallopian tubes and broad ligaments; the gravid uterus and for ectopic gestation; the stomach, the intestines, the kidneys, the liver and gall-bladder, the spleen, the pancreas and "unclassified operations," *e. g.*, those for tumours of the omentum.

Thus "abdominal" surgery and "peritoneal" surgery are nearly identical, although operations like lumbar nephrectomy are fully treated

in this work. A certain amount of artificial separation between things naturally associated is unavoidable, for instance total removal of the uterus is described, but excision of its neck is excluded. Mr. Greig Smith is not, however, the man to shirk difficulties and his decisions are always justified by common sense.

To point out all that is obviously good in each chapter would produce a review nearly as large as the book itself; and to discuss critically the various important and intensely interesting points in abdominal surgery on which there is room for difference of opinion, although our author's own opinions are generally decided enough, even on these, would result in a volume twice as long. It will be better, therefore, to notice statements, expressions and opinions gathered here and there by way of giving our readers a taste of the quality of the work, and finally state the impression produced by a careful perusal of the whole. At p. 25, writing of the significance of tympanites, he says: "I have removed a large putrid suppurating cyst, over the whole surface of which resonance could be demonstrated to a number of students and medical men. Half its contents were gaseous." At page 27 is a very good schematic arrangement of abdominal tumours for purposes of diagnosis, the primary division being into solid and fluid, the secondary into symmetrical, non-symmetrical and indifferently situated, the tertiary into localities.

When the duty of defining what is meant by "solid" as applied clinically to tumours, presents itself to our author, he finds it too much for him, and declares it "impossible." He contrives, however, to convey a very fair idea of the significance of the term.

Of *cancer of the pancreas*, he writes: "A hard, rounded or irregular tumour fixed deeply in the region of the pancreas, usually covered by bowel, and perhaps giving a sense of pulsation to palpation, with a vascular bruit on auscultation, is probably pancreatic cancer. If the growth is small, nothing may be detected beyond a deep, obscure sense of resistance and hardness. It is not often that the growth acquires dimensions large enough to be visible through the abdominal wall.

Writing of *cancer of the stomach*, he remarks: "I have seen a case of cancer of the posterior wall which caused a visible protuberance in the epigastrium."

Concerning *cysts of the pancreas*, "though not always accurately symmetrical, cysts of the pancreas lie mainly in the middle line. A rounded, thin-walled cyst, distinctly fluctuating, deeply and firmly fixed, not moving with respiration, and situated above the umbilicus, may be a pancreatic cyst. Exploratory puncture reveals a fluid, viscid or



opalescent, alkaline in reaction, and containing a considerable amount of albumen, which is coagulated by heat and nitric acid."

The importance of making a thorough investigation into the state of every vital organ of a patient on whom it is proposed to perform an abdominal operation is strongly insisted on. As a warning example, Mr. Greig Smith relates that in two cases of ovariectomy he had seen bleeding from the rectum, as an effect of pressure, which disappeared when the growth was removed. A third case had similar bleeding, but for certain reasons was not submitted to operation. Later on, the continuance of the bleeding demanded a special examination, and revealed cancer of the rectum.

Concerning exploratory incisions it is wisely remarked that "no incision ought to be merely exploratory; at the utmost, it ought to be ultimately diagnostic in a case of extreme doubt and difficulty." But in the next sentence we are told that the skilled surgeon will make a correct diagnosis in ninety-nine cases out of a hundred, which is surely an exaggeration if referring to such cases as any reasonable person would dream of making an exploratory incision in. A person who fails over his tenth case is referred to as "a tyro!" In general surgery Paget used to say that the surgeon who was right 95 times out of 100, did well.

"Having made the exploratory incision, we must not be too rash in converting it into an operative one. We ought to be sure before inflicting the slightest injury upon the growth, that we can remove it."

"The progress of abdominal surgery has not been simply forward in a straight line, but in waves of advancement and retrogression. There can be no doubt that the technique of abdominal surgery was more perfect nearly two centuries ago than it was fifty years ago." "In more than one of the works of this period" (the seventeenth and eighteenth centuries) "instructions as to the inclusion of the peritoneum in suturing the abdomen are given with scientific precision. Heister, who wrote about the middle of the eighteenth century, so far anticipated modern art as to advocate drainage of the lower abdomen by a canula, and washing it out with vulnerary decoctions." "The directions given for closing a wound by Dionis in his *Course of Surgical Operations* (1733), might almost be quoted bodily as the practice of the Samaritan Free Hospital to-day."

With reference to the *environment* of the patient, Mr. Greig Smith says that at the present time at least it is nearly as true of abdominal as of other operations, that extra care in avoiding all matters conducive to septicæmia will, with surroundings such as most surgeons can command, justify their being carried out either in general hospitals or

in private dwellings. But, of course, it is acknowledged that an ideal operating room, specially planned and arranged, is preferable when attainable.

Concerning the question of the presence of visitors, no strong opinion is expressed; but, in the Bristol Infirmary Mr. Greig Smith operates in the general theatre, placing no restrictions whatever on visitors; "and it happens by a somewhat clumsy arrangement that the administrator of anæsthetics is also the pathologist;" but the results are first-class.

He does not catheterize before operation. He thinks a distended bladder more easy to see, feel and protect. And he does not shave the pubic hair: "Septic matters lodge rather in the hair follicles, than upon the hair itself." The author of this review does shave the pubic hair, because it prevents the close application of the dressing, and clings to some dressings on their removal. But he agrees with Mr. Greig Smith that it can be made aseptic, and never removes it from the head when treating ordinary scalp wounds or removing cysts.

The question of the spray is treated with great intelligence, insight and fairness. He is himself inclined towards its use, but not bigoted. "In all cases of doubt as to the condition of the air—and such cases must be common—it is wise to use the spray." He points out how spray-producers vary in the strength of the spray they cast, and says each should be tested with measured quantities of water and lotion and noting the comparative amounts of each used. As for sponges, the surgeon must prepare them with his own hands.

He prefers Tait's catch forceps to Wells', saying that "the advantage that Tait's forceps possess is in its sharp points, which can scarcely be included in the ligature." Now the reviewer's experience is the very reverse; the sharp point of Tait's forceps frequently permits the ligature to slip back over it when tightened, and yet they are not tapering enough to throw the loop off again. Once get the ligature over the blunt ends of Wells' forceps, and it stays there. But Tait's forceps, like most other instruments, are satisfactory when handled by persons with the trick of using them.

The author figures and describes a "scissors-clamp" of his own invention. It has the appearance of a very useful instrument.

In warning against the risk of leaving foreign bodies (sponges or instruments) in the abdomen, he quotes Dr. Wilson's collection of twenty-one such cases.

For drainage, he prefers to all others, Keith's modification of Koeblerle's, namely, glass tubes with perforations near the inserted end and a protruding lip near the outer end, both ends being open.

Many surgeons will welcome the author's "suture-instrument" (described and figured at p. 70). It is a capital contrivance, and keeps a long thread clean and aseptic, instead of leaving it to draggle wherever chance may trail it.

After removal of a large tumour, he likes the plan of covering the whole abdomen with long, broad layers of strapping, which "act as a firm, unyielding splint."

When warning us against "overdoing" as a thing to be carefully avoided, he gives "separate suturing of peritoneal surfaces" as an example. He says: "Rapidity in operating is a prime virtue in abdominal surgery: and this rapidity must specially be cultivated over the more subsidiary details, as in making the parietal wound and closing it;" This is quite true, but we must be careful not to be misled into drawing false conclusions from it. The majority of abdominal operations, exclusive of those done for acute diseases and injuries, are brought to the last stage, namely, the suture of the wound in the abdominal wall, with the patient still in a condition so good that the prospect of saving a few seconds or minutes is no excuse for the surgeon to close the abdomen in any other way than the best. The mode of suturing recommended by the author is not that which the reviewer believes to be the best. The latter has seen a considerable number of ventral hernias follow it even when done by the best abdominal surgeons in London. The practice of passing the sutures through the recti is wrong because: (1). Those muscles lie together spontaneously, and (2) Sutures tend to weaken them by cutting their fibres across. The best security possible against bulging of deep parts, not in the abdomen alone, but in every region of the body, is suture of the cut (or torn) aponeuroses which lie over them. The only muscle in the median abdominal line which the reviewer would suture is the pyramidalis, the fibres of which are sometimes cut when the incision approaches the pubes and this muscle is large.

When, however, we are performing an abdominal operation which, from its difficulty or from the original state of the patient or from some other cause, is likely to produce a special degree of shock, then Mr. Greig Smith's advice must be right.

The great difference between the results attained by experienced abdominal surgeons and by beginners deters many conscientious men from commencing at all. But even these honorable and probably right thinking men are often thrust onward by circumstances. They will read with interest the following paragraph with which the general remarks on such operations conclude:

"To be prepared, at the appearance of any complication, to apply

the best known surgical technics ; to do what is wanted, and no more than is wanted ; to have the manner and method of each procedure mentally laid down in clear and definite lines ; and generally to perform the operation in steady, straightforward, workmanlike manner through the endless complications that may arise, is no trifling call on the capacities of a human being. Much of it may be learnt by intelligent practice at the expense of the patients ; much may be learnt by careful study and practice on the dead body ; but most of all will the young surgeon derive information from a close and intelligent personal attendance at the operations of our great masters. Abdominal surgery is no longer a field for legitimate and versatile experiment ; certain fixed and useful laws and customs have been laid down by the dearly-bought experience of great men : the abdominal surgeon ought to begin fully equipped with such knowledge as has been gathered for him."

In writing of ovarian cysts, Mr. Greig Smith remarks that "a rare and somewhat puzzling condition arises when there are two ovarian cysts, and their walls become fused, while their cavities communicate. In this case there are two pedicles to deal with." He might have added a warning against too great readiness to assume the presence of this condition. Given a state of things resembling it and the chances are that the imagined second pedicle is really a strong pelvic adhesion, and therefore the greatest care should be taken in searching for the ovary and tube. The reviewer has seen the mistake occur, and a diseased ovary to be left behind in consequence. The diagnosis of ovarian cysts is given very clearly. The author states that "the occasions on which tapping may be legitimately adopted are twofold: firstly, when removal of the growth is inadmissible ; and secondly, when the patient is suffering from some incidental ailment which renders postponement of operation necessary." "The operation must be conducted with a supreme regard for antiseptic purity."

The history of ovariectomy is sketched briefly and fairly. It is interesting to trace in the rise of ovariectomy how many men and nations had a hand in its birth and development, in which respect it resembles most other great contributions to surgery and indeed to science in general. The claims of Ephraim McDowell to the title of the first ovariectomist are not and cannot be disputed, but he was a pupil of John Bell, "who constantly dwelt in his lectures on the possibility and the advisability of removing such (ovarian) tumors," and John Bell was probably familiar with the writings of French surgeons who had preceded him in the same line of teaching.

While writing in the most glowing language of the success now achieved by ovariectomists, and comparing it with the fatality of earlier

times, no consideration is given to the acknowledged fact that it is now, and used not to be, the rule to operate as early as possible. Moreover, numbers of ovarian tumors are now discovered at a stage in which twenty years ago, the sufferers therefrom would scarcely have gone to a doctor. Exact accounts of the size, conditions, etc., of the individual tumours are so conspicuous by their absence from sensational lists of successes that one can conceive a skeptical person disbelieving entirely in the increase of safety in the operation of ovariectomy. Mr. Greig Smith speaks of a mortality of five per cent. in a long series of ovariectomy as "surely the ne plus ultra of all surgery." Is it really anything of the kind? Are there not numbers of early ovariectomies done nowadays in which it would be almost a crime to lose any but a minute percentage of cases?

For emptying the cyst, Keith's use of the large exhausting aspirator is considered the best plan. The practical directions for separating the adhesions are excellent, as indeed are most of the practical directions in this book.

On the great question of "clamp and cautery ligation," the author does not take sides fiercely. He is apparently prevented from so doing by Keith's success; but, like most other surgeons his sympathies and judgment incline to the ligature. Extra-peritoneal treatment of the pedicle is, of course, dead.

Some extraordinary advice is given as to peritoneum accidentally peeled off considerable extents of the abdominal parietes with an adherent cyst. "In such a case," we are told, "it is better to cut the flap clean away, than to leave it to the risk of becoming gangrenous." Given in this unqualified way, is such advice justifiable? Our experience (limited it is true) of the vitality of peritoneum is that with a good wide base of attachment a piece of reflected peritoneum is no more likely to slough than a flap of skin.

Tapping cysts of the broad ligament is objected to on the ground that they may contain papillomatous growths. The operation, therefore, endangers infection of the peritoneum.

On papillomatous cysts of the broad ligaments, so difficult to operate on in some cases, there is an excellent chapter. To most surgeons about to attempt the removal of these, the best advice would be Punch's to those about to marry, viz, "Don't."

In the history of the operation for the removal of the uterine appendages, justice is done to that remarkable man, James Blundell, of Guy's Hospital, so far in advance of his time, who advocated hysterectomy instead of Cæsarean section sustaining his arguments by experiments on rabbits, and who also proposed to bring about artificial ste-



rility by excising portions of the Fallopian tubes, after withdrawing them through an incision an inch in length in the linea alba. A fair distribution of credit is also made between Battey, Tait and Hegar. The indications for these operations are dealt with in a masterly manner. But, for all that, given a surgeon with the opinions of the author and also with the "*cacochæ operandi*," and we imagine many an ovary would go which might well be spared. In operative surgery it is evasion for a strong-willed surgeon believed, both by himself and by his patients, to possess ability and experience, to throw the responsibility of deciding on an operation on them. Nine times out of ten they either submit their will to his or else go to some other doctor, and come back with the decision of the latter, palming it off as their own. It is a mockery to speak of these poor, distressed and perplexed creatures and their husbands having the last word. They rush about imploring anyone with any pretence to knowledge of the subject to put this "last word" into their mouths.

"The disease—the extent of it and the symptoms which it produces—is the final criterion as to operative interference," writes Mr. Greig Smith. This is quite true and unfortunately true, for where a serious operation has to be done extensively for mere symptoms and extent, there is room for great regret. The pathology, causes and essential nature of the cases are scarcely taken into account. How long must the practical surgeon go on lumping together indiscriminately gonorrheal, tubercular and other affections of the tubes?

None of these considerations are sentimental, but, taken together with the still serious mortality of the operation, they are quite enough to justify the suspicion with which the mass of surgeons regard the numerous removals of the uterine appendages done by the few.

No section in the book will prove of more general interest than that on hysterectomy for malignant disease. In the chapter on hysterectomy for myoma, the author's valuation of the reproductive organs is incidentally expressed in one sentence,—"*To increase the chances of a patient's recovery by one-hundredth part, the surgeon is fully justified in removing the whole of the reproductive organs.*" From the point of view of the commonweal in most countries, this is probably true, but from that of the individual, each case should be decided on its merits. What risks would not some women run to become mothers! It follows, naturally, from his views as above expressed, that Mr. Greig Smith prefers Keith's work to Schroeder's. In this chapter both these leaders are very properly allowed to speak for themselves.

A fair comparison and a clear description are given of Porro's operation, Cæsarean section and Laparoelytrotomy.



The author is justly cautious in his estimate of the results achieved by modern gastrostomists. In operating he prefers to have the stomach undilated. "We desire to place the sutures in the stomach where there will be least traction, and this may not be where the dilated stomach presents."

'The credit of what is probably the best plan of fixing the stomach in gastrostomy belongs to Macnamara. The facts that it was used (afterwards) by Barrow who acknowledges his indebtedness to Macnamara, and that Sedillot proposed to tranfix with an ivory pin do not matter much. Macnamara's neat procedure is surely better than Sedillot's, even had the latter ever been carried out.

Most people will agree that with the exceedingly fatal results of pylorotomy "before us, we must admit that if pylorotomy is to be considered anything more than a mere 'surgical exercise,' it is to be contemplated only in a very carefully selected class of cases." Loreta's operation of dilating the pylorus after incising the wall of the stomach is a much more hopeful one.

All the gastric operations receive due attention. It is of course impossible for one person to write from personal experience of operations some of which are so rare or so new.

The practical directions for operating for intestinal obstruction are very good. The reviewer is glad to have the opportunity of bearing personal witness to the value of the method of finding the seat of obstruction recommended by Mr. Greig Smith.

It has generally happened to the former to have no difficulty in going at once straight to the seat of obstruction, the locality of which has been pretty clearly indicated by the symptoms before the abdomen was incised. But, in other cases, the plan of finding a loop of congested intestine and following it in the direction in which the congestion increased, has proved easy, speedy and sure. This is exactly what Mr. Greig Smith recommends.

For ordinary cases of resection an interrupted suture of silk is recommended for the mucous aspect and a continuous suture of catgut for the peritoneal surface.

The chapters on renal and hepatic surgery are as sound as the rest of the book. Upon exploratory puncture of the gall bladder the author looks "with no favour whatever. If the gall-bladder were considerably enlarged, if its walls were thick, and it lay in contiguity with the abdominal wall, puncture might be safe; but we can very rarely be certain that these conditions are present. The positive detection of a stone in the bladder is a clinical fact of supreme importance; but a failure to detect stone is, as more than one case has shown, no proof

that it is not there. And it is not the presence of stone that justifies operation. A stone or stones in the gall-bladder may be perfectly harmless ; we have no right to meddle with them unless they produce serious discomfort and danger."

This is the teaching of common sense combined with a practical knowledge of modern abdominal surgery.

Mr. Greig Smith's book is no mere dry enumeration of facts, theories and arguments, fit only for the specialist and operating surgeon to refer to. Every physician and practitioner who reads anything besides his daily newspaper, ought to find time to go through this book. He will find no better, no more pleasant way of learning what surgery can now do for a proportion of sufferers not small in any class of medical or family practice. And a further recommendation of this book is that it is not one likely to tempt self-sufficient and ambitious meddlers to try their untrained, unpracticed hands on cases beyond their capacity ; because its author recognizes clearly and expresses plainly the truth which should now be obvious to all that a successful surgeon must be both born and made, and that the making can only be done by time, experience and *correct* example and precept.

C. B. KEETLEY.

PRELECTIONES ANATOMIÆ UNIVERSALIS. By WILLIAM HARVEY (Harvey's Manuscript Lectures on Anatomy and Physiology). Edited with an autotype reproduction of the original by a committee of the Royal College of Physicians of London. London: J. & A. Churchill, 1886, Imp. 8vo., pp. 392.

To Sir Edward Sieveking the medical world owes a debt of gratitude that cannot well be repaid for securing the reproduction and transcript of Harvey's manuscript notes of his Lumleian Lectures on Anatomy and Physiology delivered at the Royal College of Surgeons in the years 1616, 1617 and 1618. The work is one unique in literature for the facsimile reproduction of so extensive a manuscript has never before been accomplished. Here we see Harvey, the student and teacher, the physician and physiologist, the surgeon and obstetrician, and the modest Christian scientist. It is the real Harvey of the laboratory, unobscured by any tinge of artificiality or yielding to public opinion. We catch a glimpse of the deliberation with which he put forth his conclusions, for we find that twelve years before he published his discovery of the circulation of the blood, he formulated his opinion upon the subject in the following words :

“ Constat per fabricam cordis sanguinem  
 per pulmones in Aortam perpetuo  
 transferri, as by two clacks of a  
 water bellows to rayse water  
 constat per ligaturam transitum sanguinis  
 ab arteriis ad venas  
 unde  $\Delta$  perpetuum sanguinis motum  
 in circulo fieri pulsu cordis.”

Fancy, in our age of cacoethes scribendi and reckless strife for professional precedence, a student devoting twelve years to studies confirmatory of an important discovery before publishing it!

The autotypes show how great a labor was accomplished by Mr. Edward Scott in preparing a readable transcript of the manuscript, and recalls the naive remark of Harvey's "lo friend Mr. Doctor Ent,"<sup>1</sup> in editing his work on Generation, that, "our author writes a hand which no one without practice can easily read (a thing that is common among our men of letters)," a characteristic which, by the way, may also be observed in the extant specimens of the chirography of Vesalius.

But when the text is deciphered, the difficulty of reading the work is by no means at an end, for the orthography of Harvey savored of originality in Latin as well as in English, and the Latin of these notes is as knotty and puzzling as the chirography and would have heavily taxed the ingenuity of Seneca or Quintilian. However, an idea of the meaning can be obtained with considerable readiness, although a translation is in places almost impossible. In running over the notes, the reader is amused by the comical jumble of Latin and English seen at points where perhaps a Latin equivalent did not occur to the writer in making his rapid notes. A few pages before the quotation given above, occurs the following quaint sentence: "Exempto corde frogg scipp eel crawle dogg ambulat," which might puzzle the most experienced Latinist.

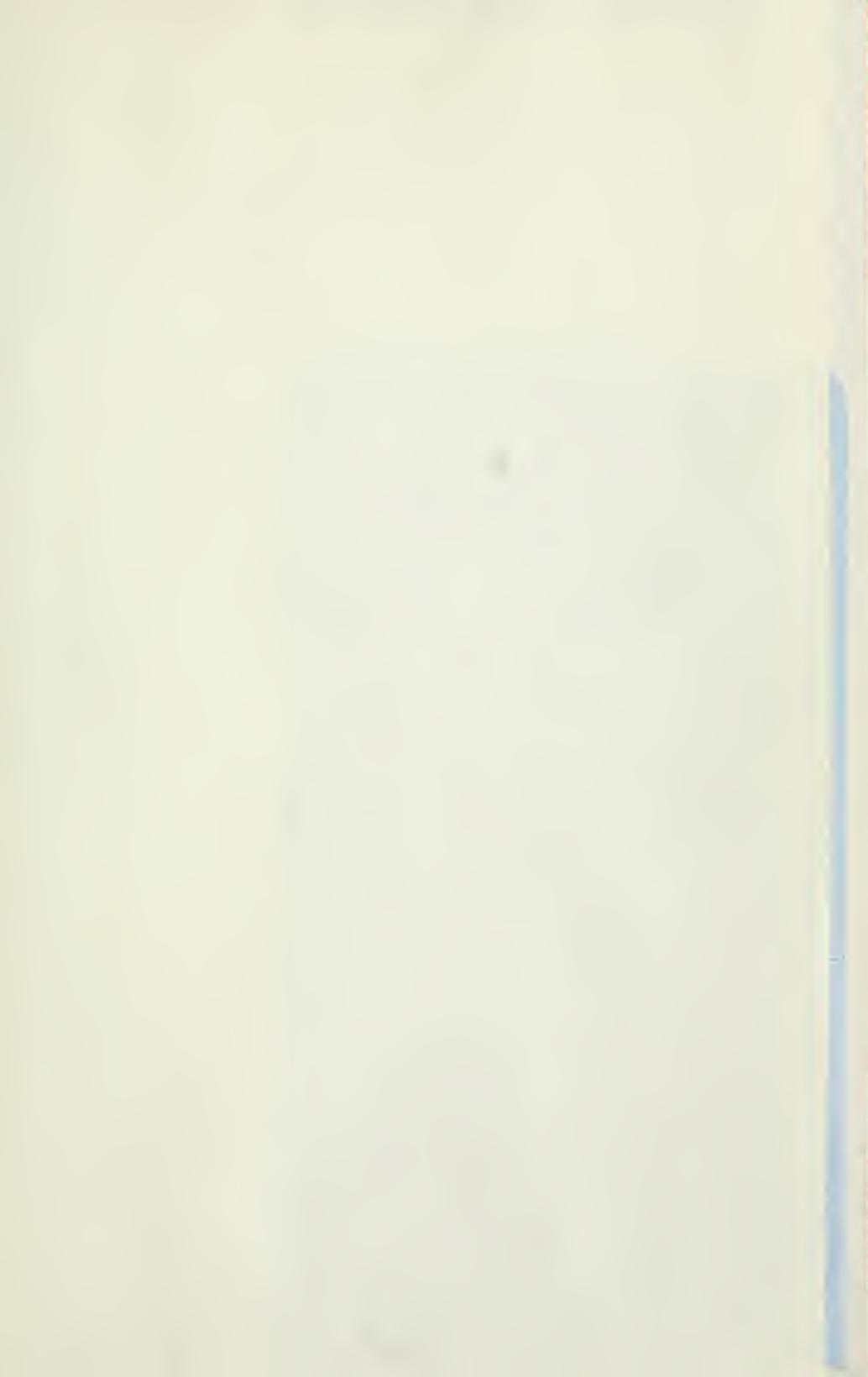
The work is prefaced by an introduction which is all too brief and leaves much to be desired. A sketch of the life and methods of work of England's immortal anatomist would have added not a little to the interest of the book. This may not be a fault, and if it is, it is the only one, for with its large clear type, beautifully tinted paper, broad margins, its splendidly executed autotypes and its luxurious Roxburgh binding, the work is a superb exemplar over which the bibliophile may well wax enthusiastic and gloat with covetous eyes.

JAMES E. PILCHER.

<sup>1</sup>Vide Harvey's Last Will and Testament.











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